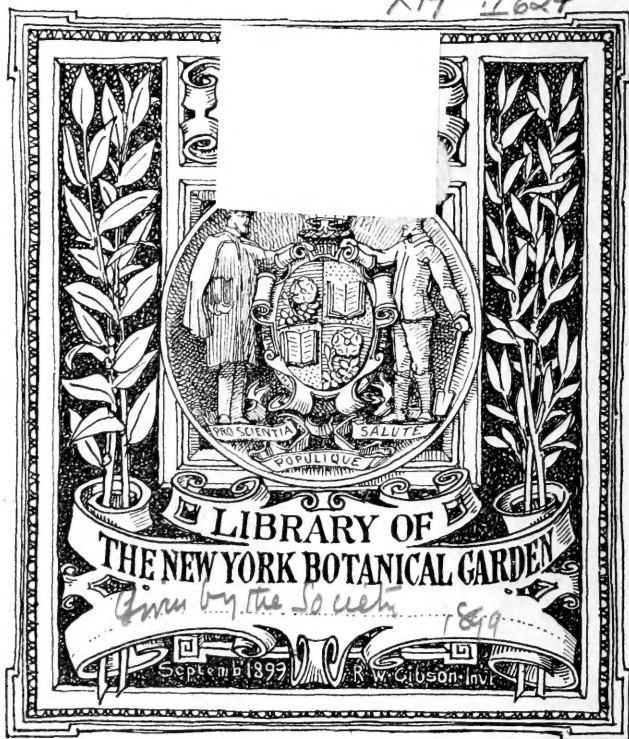
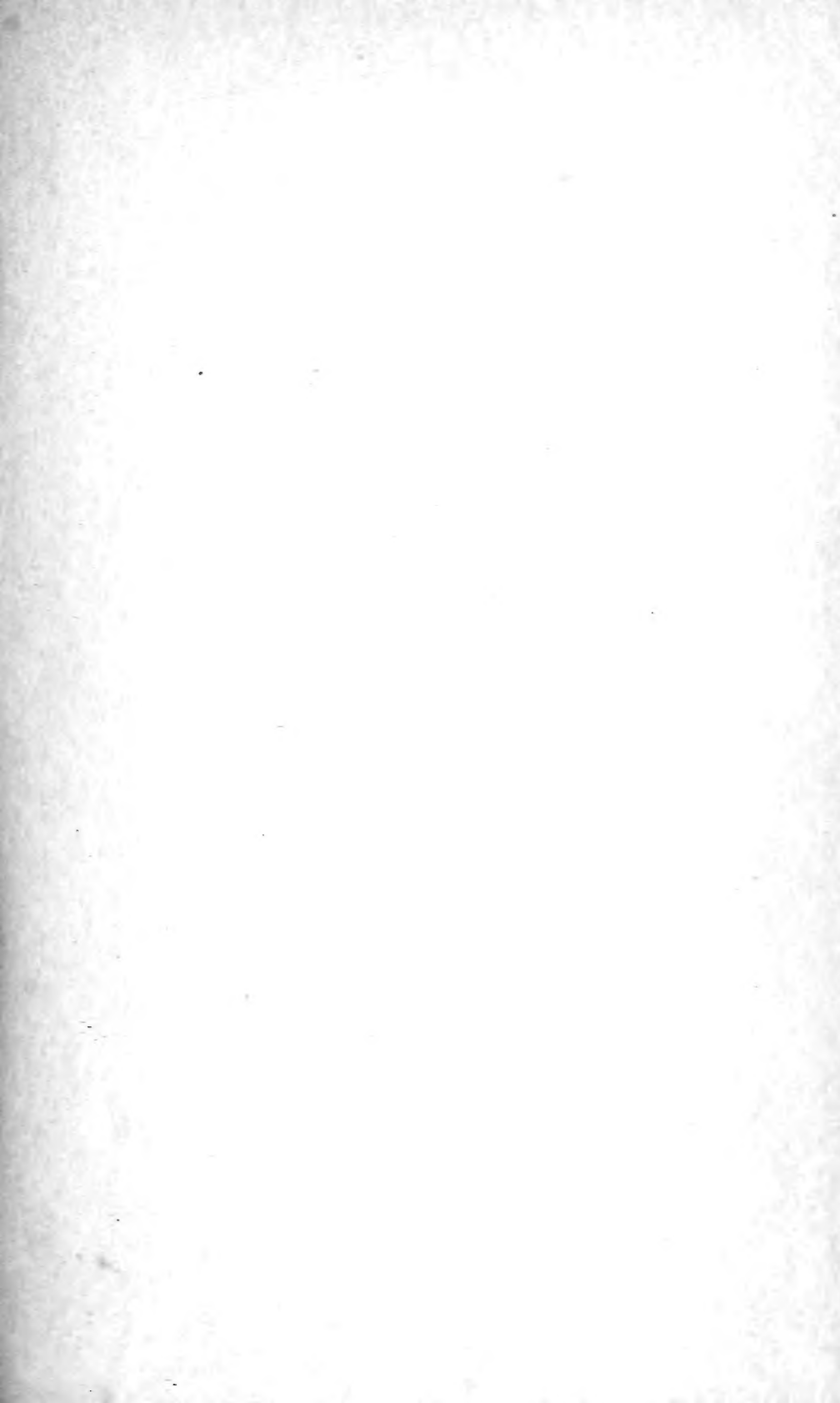


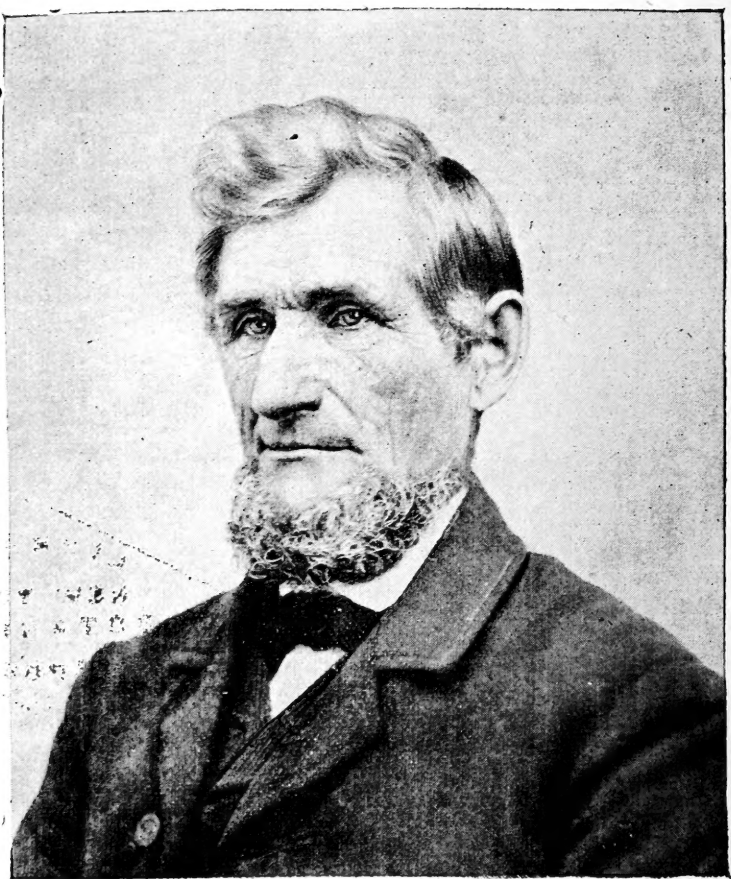
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Chas. H. Coe

EX-PRESIDENT OF THE MINNESOTA STATE HORTICULTURAL SOCIETY.

ANNUAL REPORT
OF THE
MINNESOTA STATE
HORTICULTURAL SOCIETY

FOR THE YEAR 1890,

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1889, TO MARCH
• 31, 1890, ALSO PROCEEDINGS OF THE ANNUAL MEETING
OF THE MINNESOTA BEE KEEPERS ASSOCIATION,
ESSAYS, REPORTS, ETC.

VOL. XVIII.



Prepared by the Secretary SAMUEL B. GREEN, St. Anthony Park, Minn.

MINNEAPOLIS, MINN.:
HARRISON & SMITH, PRINTERS.
1890.

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1890

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF SECRETARY,
ST. ANTHONY PARK, MARCH 30, 1890. }

To Hon. Wm. R. Merriam, Governor of Minnesota,

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1889, with supplementary papers.

Respectfully yours,

SAMUEL B. GREEN,
Secretary Minnesota State Horticultural Society.

OFFICERS AND MEMBERS FOR 1890.

PRESIDENT.

WYMAN ELLIOT.....Minneapolis.

VICE PRESIDENTS.

A. W. SIAS.....Rochester.

ALFRED TERRY.....Slayton.

O. F. BRAND.....Faribault.

M. PEARCE.....Chowan.

J. O. BARRETT.....Brown's Valley.

SECRETARY.

SAMUEL B. GREEN.....St. Anthony Park.

TREASURER.

DITUS DAY.....Farmington.

EXECUTIVE COMMITTEE.

A. W. LATHAM, Chairman.....Excelsior.

J. S. HARRIS.....La Crescent.

J. M. UNDERWOOD.....Lake City.

M. CUTLER.....Sumter.

L. H. WILCOX.....Hastings.

ENTOMOLOGIST.

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ANDREW PETERSON.....	Waconia.
JAMES POOLE.....	Farmington.
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J. S. HARRIS.....	La Crescent.
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GUST. MALMQUIST.....	Minneapolis.

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WILLIAM H. BRIMHALL.....	Hamline.

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OTTO BULLIS.....	Winnebago City,
BURTON L. WILCOX.....	Hastings.

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CUTLER, MILON.....	Sumter.
CUZNER, E. A.....	Minneapolis.
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CRANDALL, ETHAN.....	Sumter.
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DENNIS, A. B.....	Cedar Rapids, Iowa.
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DOUGHTY, J. COLE.....	Lake City.
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FURBER, J. T.	Madelia.
FLECKTEN, JOHN E.	Kandiyohi.
GOULD, MRS. F. G.	Excelsior.
GRAY, J. S.	Minneapolis.
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GUSTAFSON, CHAS.	Bigelow.
GILBERT, FRED A.	Beardsley.
GREEN, MRS. SAMUEL B.	St. Anthony Park.
GILFILLAN, CHAS. O.	Morgan.
HARRIS, E. E.	La Crescent.
HARRIS, J. S. and Son.	La Crescent.
HILLMAN, UNO H.	Forrestdale, Mass.
HILLMAN, S. D.	Minneapolis.
HEIDEMAN, HON. C. W. H.	New Ulm.
HALL, PROF. C. W.	Minneapolis.
HIGBEE, WILLIAM.	Grand Meadow.
HOVERSTADT, TORGER A.	Holden.
HOGAN, O. J.	Hendrum.
JESSUP, G. H.	Tracy.
KENNEDY, MRS. A. A.	Hutchinson.
KENNEY, SETH H.	Morristown.
KRAMER, J. C.	La Crescent.
LATHAM, A. W.	Excelsior.
LAUCK, J. B.	Fourth and Townsend Sts., San Francisco, Cal.
LITTLE, JOHN.	Granton, Ont.
LUEDLOFF, CHAS.	Carver.
LUNDBERG, CHAS. A.	Worthington.
LYONS, WM.	Minneapolis.
LEE, GUNDER J.	Chippewa Falls, Wis.
LUNDWALL, NELSON.	Bozeman, Mont.
LUGGER, PROF. OTTO.	St. Anthony Park.
LUPTON, R. P.	Excelsior.
LEVESCONTE, JOHN.	St. Anthony Park.
MACKINTOSH, WM.	Langdon.
MAY, L. L. & Co.	St. Paul.
MAYNARD, M. M.	Excelsior.
MENDENHALL, R. J.	Minneapolis.
MILLER, C. F.	Faribault.
MILLS, L. D.	Garden City.
MORRIS, W. H.	Excelsior.
MOYER, T. R.	Montevideo.
MURRAY, J. W.	Excelsior.

MACMILLAN, PROF. CONWAY.....	Minneapolis.
MERRILL, D. D.....	St. Paul.
MOYER, LYCURGUS R.....	Montevideo.
MACKINTOSH, R. S.....	Langdon.
MALENQUIST, GUST.....	Minneapolis.
MINER, JULIUS E.....	Minneapolis.
NAGEL, E.....	Minneapolis.
NORSWING, K. B.....	Holden.
OESTLAND, PROF. O. W.....	Minneapolis.
PARTRIDGE, SAM.....	Moorhead.
PENDERGAST, PROF. W. W.....	Hutchinson.
PERKINS, DR. E. R.....	Excelsior.
PERKINS, F. L.....	Excelsior.
PERKINS, W. E.....	Excelsior.
PETERSON, ANDREW.....	Waconia.
PUFFER, DR. F. L.....	Bird Island.
PENNELL, PROF. C. S.....	St. Anthony Park.
RAND, E. R.....	Bloomington.
SAMPSON, CHAS. W.....	Excelsior.
SAMPSON, J. A.....	Excelsior.
SCOTT, N. G.....	Winnipeg, Man.
SMITH, JAMES.....	Brookings, S. Dak.
SOMERVILLE, WM.....	Viola.
STRANDWOLD, O.....	Trysil, N. Dak.
SWANSON, AUG.....	St. Paul.
STAGER, MRS. JENNIE.....	Sauk Rapids.
SEWALL, MISS MARGARET L.....	St. Paul.
SOLEN, REV. O. A. THE.....	Halsted.
SANDERS, JESSE J.....	Appleton.
SANDSTEN, EMIL.....	St. Anthony Park.
STREET, A. H.....	Alden.
TAYLOR, JAMES.....	Slayton.
TERRY, ALFRED.....	Slayton.
THORNDIKE, DAVID.....	Slayton.
TOFTING, J. J. & Co.....	Tracy.
TODD, IRVING.....	Hasting.
THAYER, MRS. P. A.....	Sauk Rapids.
TRENHAM, N. J.....	Alexandria.
UNDERWOOD, MRS. ANNA B.....	Lake City.
UNDERWOOD, J. M.....	Lake City.
VOSBURG, C. C.....	Lake City.
WARNER, C. F.....	Excelsior.
WHITE, L. D.....	Minneapolis.

WICKERSHEIN, WM. J.....Idlewild, Lincoln Co.
 ZATTERSTROM, J. F.....Spencer Brook, Isanti Co.

HONORARY MEMBERS FOR FIVE YEARS.

EDSON GAYLORD from 1886.....Nora Springs, Iowa.
 J. E. CORLETT from 1887.....Farmersburg, Iowa.
 B. S. HOXIE.....Evansville, Wis.
 H. R. HUNTER.....Sioux Falls, S. Dak.
 C. H. BRETT.....Henry, S. Dak.
 J. S. B. THOMPSON, from 1888.....Grundy Centre, Iowa.
 MISS EDITH A. KELLOGG.....Janesville, Wis.
 PROF. W. H. RAGAN, from 1889.....Greencastle, Ind.
 MRS. V. H. CAMPBELL.....Evansville, Wis.
 A. J. PHILIPS.....West Salem, Wis.
 ELMER REEVES.....Waverly, Iowa.
 THOS. FRANKLAND.....Stonewall, Man.
 C. C. BELL.....Booneville, Mo.
 FRANK BURNETT, from 1890.....Glenboro, Man.
 MRS. FRANK BURNETT.....Glenboro, Man.

HONORARY LIFE MEMBERS.

HON. MARSHALL P. WILDER (deceased).....Boston, Mass.
 DR. JOHN P. WARDER (deceased).....North Bend, Ohio.
 DR. P. A. JEWELL (deceased).....Lake City.
 HON. L. B. HODGES (deceased).....St. Paul.
 D. W. HUMPHREY (deceased).....Faribault.
 CHARLES HOAG (deceased).....Minneapolis.
 MRS. WEALTHY GIDEON (deceased).....Excelsior.
 HON. N. J. COLEMAN.....St. Louis, Mo.
 GEORGE P. PEFFER.....Pewaukee, Wis.
 J. C. PLUMB.....Milton, Wis.
 J. M. SMITH.....Green Bay, Wis.
 E. WILCOX.....La Crosse, Wis.
 PROF. J. L. BUDD.....Ames, Iowa.
 CHARLES GIBB.....Abbotsford, Quebec.
 A. C. TUTTLE.....Baraboo, Wis.
 F. K. PHOENIX.....Delavan, Wis.
 J. W. MANNING.....Boston, Mass.
 MRS. J. W. MANNING.....Boston, Mass.
 MRS. WM. PAIST.....Hersey.
 CHARLES Y. LACEY.....Fort Benton, Mont.
 COL. J. H. STEVENS.....Minneapolis.
 J. S. HARRIS.....La Crescent.

R. J. MENDENHALL.....	Minneapolis.
H. W. S. CLEVELAND.....	Minneapolis.
TRUMAN M. SMITH.....	San Diego, Cal.
L. M. FORD.....	San Diego, Cal.
WYMAN ELLIOT.....	Minneapolis.
J. T. GRIMES.....	Minneapolis.
A. W. SIAS.....	Rochester.
PETER M. GIDEON.....	Excelsior.
M. PEARSE.....	Chowan.
COL. D. A. ROBERTSON.....	St. Paul.
R. L. COTTERELL.....	Dover.
CHARLES LUEDLOFF.....	Carver.
OLIVER GIBBS, JR.....	Ramsey, Dak.
ANDREW PETERSON.....	Waconia.
E. H. S. DARTT.....	Owatonna.
A. W. LATHAM.....	Excelsior.
F. G. GOULD.....	Excelsior.
O. F. BRAND.....	Faribault.
C. L. SMITH.....	Minneapolis.
MRS. C. O. VAN CLEVE.....	Minneapolis.
MRS. JAMES BOWEN.....	Minneapolis.
MRS. IDA E. TILSON.....	West Salem, Wis.
MRS. H. B. SARGEANT.....	Lake City.
MISS SARAH MANNING.....	Lake City.
PHILIP HERZOG.....	Chowan.
SIDNEY CORP.....	Hammond.

NURSERYMEN AND FLORISTS WHO ARE MEMBERS OF THE MINNESOTA STATE HORTICULTURAL SOCIETY.

NURSERYMEN.

BARRETT, J. O.....	Brown's Valley.
BRAND, O. F.....	Faribault.
BUNNELL, M. C.....	Newport.
GIDEON, PETER.....	Excelsior.
HARRIS, J. S. & SON.....	La Crescent.
JEWELL NURSERY Co.....	Lake City.
KRAMER, J. C.....	La Crescent.
LATHAM, A. W.....	Excelsior.
LUEDLOFF, Chas.....	Carver.
PEARSE, M.....	Chowan.
PEFFER, GEO. P.....	Pewaukee, Wis.
SIAS, A. W.....	Rochester.

SMITH, C. L.....	Minneapolis.
TUTTLE, A. C.....	Baraboo.
TOFTING, J. J. & Co.....	Tracy.
WILCOX, E.....	La Crosse, Wis.

FLORISTS.

GOULD, F. G.....	Excelsior.
NAGLE, E. & Co.....	1118 W. Lake St., Minneapolis.
GRAY, J. S.....	Minneapolis.
MAY, L. L. & Co.....	St. Paul.
MENDENHALL, R, J.....	Minneapolis.
MALMQUIST, GUST.....	Minneapolis.
SWANSON, AUG.....	St. Paul.

OFFICERS

OF THE

Minnesota State Agricultural Society,

FOR THE YEAR 1890.

PRESIDENT.

FRED. C. PILLSBURY.....Minneapolis.

1ST VICE PRESIDENT.

D. H. MOON.....St. Paul, Minn.

2D VICE PRESIDENT.

S. M. EMERY.....Lake City, Minn.

SECRETARY AND GENERAL MANAGER.

WM. M. LIGGETT.....Hamline, Minn.

TREASURER.

FRANK J. WILCOX.....Northfield, Minn.

BOARD OF MANAGERS.

J. F. NORRISH.....Hastings, Minn.

CLARK CHAMBERS.....Owatonna, Minn.

JOHN COOPER.....St. Cloud, Minn.

C. N. COSGROVE.....Le Sueur, Minn.

WM. M. LIGGETT.....Hamline, Minn.

J. J. ALEXANDER.....Northfield, Minn.

* * * The management pledge themselves to make, and invite the co-operation of agriculturists, horticulturists, and others to help in making, this year's fair the best ever held. Liberal premiums are offered in every department. For any information address the Secretary, Hamline, Minn.

CONSTITUTION
OF THE
MINNESOTA HORTICULTURAL SOCIETY.

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members entitled to all the rights and privileges of membership by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this Society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disbursements of the Society and present the same at the annual winter meeting, or any other time when called upon to do so by the executive committee. He shall give bonds in such sums as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot and hold their offices until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the future wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

AMENDMENTS TO THE CONSTITUTION.

1. Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, providing that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

II. Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members entitled to all the rights and privileges of membership, by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

BY-LAWS.

1. The president, at each annual meeting of the Society shall appoint a general fruit committee, consisting of two members from each congressional district in the state, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pertaining to the interest of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum*.—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA STATE HORTICULTURAL SOCIETY.

TWENTY-THIRD ANNUAL MEETING

HELD IN THE

TOWN HALL, EXCELSIOR, MINN.,

TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JANUARY 21, 22, 23, 24, 1890.

IN JOINT SESSION WITH THE

MINNESOTA BEEKEEPERS' ASSOCIATION.

NOTE.—The Society will not be held responsible for individual opinions which are found in this report.—*Secretary.*

Following is the circular sent out announcing the annual winter meeting of the Society:

An invitation has been extended to the Minnesota State Horticultural Society by the public-spirited citizens and horticulturists of Excelsior to hold its twenty-third Annual Session at that place January 21, 22, 23 and 24, 1890.

The Beekeepers' Association will occupy a portion of Friday morning for its second Annual Meeting, and will discuss questions pertaining to Apiary Culture, and as related to horticulture.

Excelsior is pleasantly situated on the southern shore of Lake Minnetonka, and is one of the best fruit growing districts of the State, and is justly celebrated for its horticultural products. It is a suburb of Minneapolis, eighteen miles distant, and is reached via the Minneapolis and St. Louis Railway, the depot in Minneapolis being at the corner of Third street and Fourth avenue north. Trains leave for Excelsior at 8:45 and 11 o'clock a. m., and 5:30 p. m.; returning, leave Excelsior at 7:50 a. m., 12:35 and 4:25 p. m.

A cordial invitation is extended to kindred organizations in other states as well as to Local Societies, to send delegates to the meetings, which are *free* to all. Ladies especially are invited to attend; also, young ladies and gentlemen who desire to become

better informed on horticultural topics and to take part in the exercises and discussions.

Members of the Society, so far as possible, are urged to be present, to bring with them all interested and to come to the meeting prepared to render personal assistance in making the session one of unusual profit and interest to all concerned. Come to the meeting and relate your experience with horticultural products in the past and your views as to safest, and best methods of care and culture for the future. Give such hints and suggestions as may seem proper, as to methods of culture, character of soil, protection and care, marketing of garden and farm products, etc., etc.; especially reporting your experience with any new varieties of vegetables, fruits or flowers. Thus by an interchange of ideas we hope to make sure and steady advancement in the really interesting and fascinating study of Horticulture in its various branches. Time will be given so far as possible to discussion of the several topics presented, and the Question Box will also be a feature. Reports will be expected from members of special and standing committees, either orally or by manuscript; the same to be brief and to the point. This is important as indicating the progress being made in the cause from year to year throughout the State.

Premiums are to be given for exhibits of fruits, flowers, vegetables, etc., but not on inferior or unworthy articles, even if there is no competition. It is hoped a large and creditable exhibit may be made.

It is expected the usual reduction in rates of fare to delegates will be obtained from the various lines of railway in this State. Delegates on purchasing a full fare ticket going should at the same time secure from the Agent a Delegate's Convention Receipt, specifying that such ticket has been purchased, in order that the same may be properly endorsed for the return trip.

Members and delegates in attendance will be provided with entertainment, and it is requested that previous notice be sent by delegates to the chairman of the local committee on entertainment, Mr. F. G. Gould, Excelsior.

For further particulars, address

S. D. HILLMAN,

Secretary, Minneapolis,

WYMAN ELLIOT,

President, Minneapolis.

State Horticultural Society.

WM. URIE,

Secretary, Minneapolis,

L. H. WILCOX,

President, Hastings.

Minnesota Beekeepers Association.

PROGRAM.

FIRST DAY.—TUESDAY, JANUARY 21, AT 10 A. M.

Opening Prayer. Rev. J. Lamberton, Excelsior.

Strawberries; Varieties, Culture, Marketing, etc. Prof. S. B. Green, St. Anthony Park.

Discussion.

Currant Culture. Dr. M. M. Frisselle, Excelsior.

Gooseberries. Varieties, Culture and Marketing. Phil. Strubler, Napier,

Ill.

Gooseberries. Swedish and Native Seedlings. Gust. Malmquist, Minneapolis.

Discussion.

Arrangement of Exhibits and Reception of Members.

AFTERNOON SESSION.—AT 2 P. M.

Blackberries. Mr. Cutler, Excelsior.

Growing Small Fruits for Profit. M. Pearse, Chowan.

Evergreens and Deciduous Trees. O. F. Brand, Faribault.

Economical Forestry. J. O. Barrett, Browns Valley. Discussion.

Reports of Local Societies: Southern Minnesota Horticultural Society, H. W. Stedman, Secretary, Rochester; Minnesota Valley Horticultural Society, O. E. Saunders, President, Granite Falls; Lake Side Horticultural Society, J. O. Barrett, President, Browns Valley; McLeod County Horticultural Society, Mrs. A. A. Kennedy, Secretary, Hutchinson; Ramsey County Agricultural and Horticultural Society, E. A. Venzke, Secretary, St. Paul.

Correspondence, etc. Question Box and Discussion.

EVENING SESSION.—AT 7 P. M.

Music.

Address of Welcome. Dr. E. R. Perkins, Excelsior.

Response. J. T. Grimes, Minneapolis.

President's Annual Address. Wyman Elliot, Minneapolis.

Music.

Recitation. Prof. Harter, Excelsior.

Annual Report of Secretary.

Annual Report of Treasurer.

Report of Librarian.

Report of Committee on Library.

SECOND DAY.—WEDNESDAY, JANUARY 22, AT 9 A. M.

Appointment of Committees. Committee on Fruit List, Award of Premiums, Reports, Publication, Final Resolutions, and Obituaries.

Orchards and Orchard Topics

Raising Seedlings, etc. E. Wilcox, LaCrosse, Wis. Discussion.

Tree Bark. A. W. Sias, Rochester.

Report of Committee on Russian Apples. E. H. S. Dartt, Owatonna; Wm. Somerville, Viola, and Andrew Peterson, Waconia.

Fruit Growing in Minnesota. D. K. Michenor, Etna. Discussion.

Varieties of Apples that have been and are grown in Minnesota. J. S. Harris, LaCrescent.

Native Plums. J. S. Harris, LaCrescent. Discussion.

Report of Seedling Committee: J. S. Harris, La Crescent; A. W. Sias, Rochester; G. W. Fuller, Litchfield.

AFTERNOON SESSION.—AT 2 P. M.

Future of Grape Culture in Minnesota. A. W. Latham, Excelsior.

Experience of a Grape Grower. J. S. Featherstone, Nininger.
Discussion.

New Varieties of Grapes. Geo. R. Robinson, Minneapolis.

Grape Insects and Diseases. Report of Committee.

Question Box and Discussion.

EVENING SESSION.—AT 7 P. M.

Music.

Horticulture among the Masses. J. O. Barrett, Browns Valley.

The Farm School as related to Horticulture. Prof. W. W. Pendergast, St. Anthony Park.

Entomologist's Report Prof. O. W. Oestlund, Minneapolis

Insects Injurious to Small Fruits. Prof. Otto Luggar, St. Anthony Park.

Insects and Horticultural Notes. R. J. Mendenhall, Minneapolis.

Report of Committee on Entomology and discussion.

Ornithology. Dr. P. L. Hatch, Minneapolis.

THIRD DAY.—THURSDAY, JANUARY 23, AT 9 A. M.

Wild Flowers of Minnesota. Col. J. H. Stevens, Minneapolis.

Commercial Plant Growing. Wm. Desmond, Minneapolis.

Cultivation of Commercial Cut Flowers. Walter A. Smith, Minneapolis.

How not to Build a Greenhouse. A. W. Latham, Excelsior.

Growing and Forcing Hardy and Tender Roses. Wm. Hartman, Minneapolis.

Hardy Shrubs, Plants and Bulbs for Lawn Decoration. Gust. Malmquist, Minneapolis.

Pansy Culture. William Toole, Baraboo, Wis.

Discussion.

Report of Finance Committee.

AFTERNOON SESSION.—AT 2 P. M.

Ad. Interim or District Reports. By Vice Presidents of the Society. A. W. Sias, Rochester; Alfred Terry, Slayton; M. Cutler, Sumter; M. Pearse, Chowan; J. O. Barrett, Browns Valley.

Annual Election of Officers. By ballot.

Potatoes, Cost and how to Market. L. H. Wilcox, Hastings.

Discussion.

Best Early Vegetables for Profit. Joshua Allyn, Red Wing.

Melons. J. A. Sampson, Excelsior.

EVENING SESSION.—AT 7 P. M.

Music.

Roses and Night Shades. Mrs. A. E. Larkin, Mankato.

Growing Hollyhocks. F. H. Carleton, Minneapolis.

Lecture or Address. Miss Maria L. Sanford, State University, Minneapolis.

Rational and Hygienic Cookery. Mrs. Clara S. Hays, St. Anthony Park.

Structure, etc., of the Honey Bee. Illustrated lecture by Prof. N. W. McLain, Director State Experiment Station, St. Anthony Park.

. FOURTH DAY.—FRIDAY, JANUARY 24, AT 9 A. M.

Award of Premiums.

Apiary Culture and Syrup.

Report on Amber Cane Products. S. H. Kenney, Morristown.

At Noon, Basket Picnic.

AFTERNOON SESSION.—AT 2 P. M.

Reports from Experiment Stations:

PROF. SAMUEL B. GREEN, St. Anthony Park.

E. H. S. DART, Owatonna.

J. S. HARRIS, LaCrescent.

O. M. LORD, Minnesota City.

UNDERWOOD & EMERY, Lake City.

A. W. SIAS, Rochester.

O. F. BRAND, Faribault.

M. PEARCE, Chowan.

G. W. FULLER, Litchfield.

R. M. PROBSTFIELD, Moorhead.

ANDREW PETERSON, Waconia.

CHARLES LUEDLOFF, Carver.

B. TAYLOR, Forestville.

FRED VON BAUMBACH, Alexandria.

L. E. DAY, Farmington.

Report of General Fruit Committee:

SIDNEY CORP, Hammond.

D. K. MICHENOR, Etna.

J. C. KRAMER, La Crescent.

O. E. SAUNDERS, Granite Falls.

O. F. NORWOOD, Balaton.

M. C. BUNNELL, Newport.

M. J. STUBBS, Long Lake.

WILLIAM MCHENRY, St. Charles.

O. M. LORD, Minnesota City.

CLARENCE WEDGE, Albert Lea.

GEORGE E. CASE, St. Peter.

M. CUTLER, Sumter.

G. W. FULLER, Litchfield.

L. E. DAY, Farmington.

CHARLES LUEDLOFF, Carver.

W. H. BRIMHALL, Hamline.

J. H. LUDLOW, Worthington.

Reports of Special Fruit Committee on Fruit Lists and Revision of Same.

Report of Committee on Nomenclature.

Report of Special Committees.

Report of Committee on Legislation.

Report of Committee on Final Resolutions.

Place of Next Meeting.

Miscellaneous Business.

Final adjournment.

PREMIUM LIST.

A. BOST, EXCELSIOR, Superintendent of Exhibits.

APPLES.

(All plates to consist of five specimens.)

Best collection of Minnesota Apples, including Hybrids, first premium, \$5.00; second, \$3.00; third, \$2.00.

Best display of Wealthy, first premium, \$3.00; second, \$2.00; third, \$1.00.

Best Plate of Winter Apples, any variety, first premium, \$2.00; second, \$1.00.

Best Plate Winter varieties Russian Apples, first premium, \$2.00; second, \$1.00.

GRAPES.

Best display of Native Grapes, in good condition, first premium, \$5.00; second, \$3.00; third, \$2.00.

Best plate, any variety, first, \$3.00; second, \$2.00.

Best display of fruit in jars, first premium, \$5.00; second, \$3.00.

PLANTS AND FLOWERS.

	1st. Prem.	2nd Prem.
Best display ornamental and flowering plants.....	\$5.00	\$3.00
Best display of roses in pots.....	2.00	1.00
Best display geranium.....	2.00	1.00
Best display single plant in bloom.....	2.00	1.00
Best display begonias.....	2.00	1.00
Best display carnations.....	2.00	1.00

CUT FLOWERS.

Best and most artistically arranged design, first premium, \$5.00; second, \$3.00.

Best collection roses, first premium, \$3.00; second, \$2.00.

Best hand bouquet, first premium, \$3.00; second, \$2.00.

Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, \$5.00; second, \$3.00.

VEGETABLES.

Best display.....	\$5.00	\$3.00
Best half peck early potatoes.....	2.00	1.00
Best half peck potatoes for winter and spring.....	2.00	1.00
Best half peck onions.....	2.00	1.00
Best half peck turnips.....	2.00	1.00
Best half peck beets.....	1.00	.50
Best half peck parsnips.....	1.00	.50
Best half peck carrots.....	1.00	.50
Best Hubbard squash.....	1.00	.50
Best six bunches celery.....	1.00	.50
Best winter cabbage.....	1.00	.50
Best winter lettuce.....	1.00	.50

PANTRY STORES.

Best display canned fruits, product of 1889, \$3.00; second best, \$2.00.

Best display of jellies, \$2.00; second best, \$1.00.

Best jar mixed pickles, \$1.00; second best, 50 cents.

Best exhibit home-made vinegar, \$1.00; second best, 50 cents.

Best exhibit comb honey, \$3.00; second best, \$2.00; third best, \$1.00.

Best exhibit extracted honey, \$3.00; second best, \$2.00; third, \$1.00.

WORKS OF ART.

Display of Garden tools and Horticultural Implements. Certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by 10 o'clock a. m. the second day.

Competition shall be open to all, but it is expected that the annual membership fee (\$1) will be contributed unless exhibitors are members of the Society. All members are entitled to bound copies of the Transactions.

The following circular was sent by the President Elect to all members of committees, after being properly filled out:

MINNEAPOLIS, MINN.

DEAR SIR:

It is expected you will make a short comprehensive report on.....
(see Minnesota State Horticultural Report, page.....),
giving items of interest, with your impression, favorable or unfavorable, as to value for this climate. Please do not fail to make a report, for it is from these we expect our members will derive their greatest source of information. If you cannot be present at the meeting (at Excelsior, Jan. 21-24,) in person, please mail your report before Jan. 15th, to the Secretary, S. D. HILLMAN, Minneapolis.

Respectfully,

WYMAN ELLIOT, President.

P. S.—If you have not received the Horticultural Report for 1889, Vol. 17, notify the Secretary at once, and he will forward you a copy. W. E.

FRUIT LISTS AS RECOMMENDED BY THE SOCIETY.

FRUIT LISTS FOR SOUTHERN MINNESOTA.

APPLES.

For general cultivation—Duchess, Hiberna, Tetofsky, Peach.

For favorable locations—Wealthy, McMahon White, Hiberna, Autumn Streaked.

NEWER RUSSIAN VARIETIES.

For trial—White Russett, Ostroff, Garden, Titovka, Yellow Anis, Antonovka, White Pigeon, Charlamoff, Koursk Anis.

SEEDLINGS.

For trial by experiment stations—Okabena, Peerless, Victor, Unknown, Duchess No. 3.

CRABS—HYBRIDS.

Transcendent, Early Strawberry, Martha, Orange, Florence, Powers Virginia.

For trial at experiment stations—Dartt, Greenwood, Tonka, Euranda, Gibb.

GRAPES.

In favorable locations—Concord, Worden, Moore's Early, Delaware, Brighton, Lady.

For trial—Moore's Diamond, Woodruff Red, Early Victor, Jessica, Thayer.

STRAWBERRIES.

For general cultivation—Crescent, Countess or Downer, Capt. Jack, and on strong soils, Wilson.

For trial—Marfield No. 2, Bubach No. 5, Jessie, Martha, Princess, Park Beauty.

RASPBERRIES.

Blackcaps—Souhegan, Ohio.

Reds—Cuthbert, Turner, Brandywine.

Yellow, for trial—Caroline.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

DEWBERRIES.

For trial—Windom, Lucretia.

CURRANTS.

Red Dutch, Victoria, Prince Albert, Long Bunch Holland, White Grape.

For trial—Fay's Prolific, Stewart.

GOOSEBERRIES.

Downing, Houghton Seedling.

SELECT NATIVE PLUMS.

DeSoto, Rollingstone.

For trial—Rockford, Cheney and others of Northern origin.

FRUIT LIST FOR CENTRAL MINNESOTA.

APPLES.

For favorable locations—Wealthy and Duchess of Oldenberg

RUSSIAN VARIETIES.

For favored locations—Lieby.

CRAB APPLES.

For general cultivation—Transcendant, Hyslop, Early Strawberry, Virginia.

NATIVE PLUMS.

DeSoto, Weaver, Forest Garden, Rollingstone.

GRAPES.

(Must be covered in winter.)

Early varieties—Lady, Moore's Early.

Medium varieties—Rogers' No. 3, 9 and 44, Delaware, Worden and Brighton.

Late varieties—Concord, Pocklington, Iona.

BLACKBERRIES.

(Must be covered in winter.)

Ancient Briton, Snyder.

RASPBERRIES.

(Should be covered in winter.)

Blackcaps—Doolittle, Lonhegan, Gregg.

Reds—Cuthbert, Turner.

CURRANTS.

(Pays to cover.)

Red—Red Dutch, Victoria.

White—White Grape.

GOOSEBERRIES.

(Pays to cover.)

Downing, Houghton.

STRAWBERRIES.

Wilson, Crescent.

FRUIT LIST FOR NORTHERN MINNESOTA.

In reply to a letter asking him to recommend a fruit list for the northern section of the state, Mr. Probstfield replied as follows:

MOORHEAD, MINN., MARCH 23, 1890.

PROF. SAMUEL B. GREEN,

St. Anthony Park, Minn.

MY DEAR SIR:

I received yours of 20th inst. on the 21st, and regret very much that I had not time to reply at once, yet there will not be much missed if this is not "on time". I cannot recommend a fruit list in line of apple trees or grapes for northern Minnesota. My fail-

ures do not warrant the same, but will do the best under the circumstances.

Transcendant is perfectly hardy at this station and I can recommend them planted in large numbers as profitable—if they find a locality—where they do not blight. Mine are all gone by blight, and since the blight struck my orchard, all the young trees replanted died first, second and third year.

Duchess of Oldenburg—Whitney No. 20, and Tetofsky have held out so well here that I recommend them for trial on small scale. I never fruited them but came near to it. With straw, hay or paper protection around trunk for the first six or seven years I am confident they will stand the cold winters. I have a number of Russians on trial of which I hope I may be able to recommend some in the future, but not now. Currants all do well, tried by me, except the Fay. Smith & Houghton's seedling gooseberries have done well, and Turner's red Raspberry also. I'm sorry I cannot do better than this, but facts are facts,

In haste very truly yours,

R. M. PROBSTFIELD.

TWENTY-THIRD ANNUAL MEETING
OF THE
MINNESOTA STATE HORTICULTURAL SOCIETY,

IN JOINT SESSION WITH THE
MINNESOTA BEEKEEPERS' ASSOCIATION.

HELD AT TOWN HALL, EXCELSIOR, MINN., TUESDAY, WEDNESDAY, THURSDAY
AND FRIDAY, JANUARY 21, 22, 23 AND 24, 1890.

FIRST DAY, TUESDAY.

MORNING SESSION.

The meeting was called to order at ten o'clock by President Elliot, and Rev. J. Lamberton of Excelsior, offered prayer.

Mr. Gould.

Mr. President, Visitors and Members of the State Horticultural Society:

Some of our young ladies and gentlemen have volunteered to enliven our sessions with some music. They will be the entertainers of the delegates, and visitors, and members of the State Horticultural Society, and in this manner season our discussions with pepper and salt, and make them interesting. The selection this morning will be a song entitled, "The Rising of the Stars."

President Elliot. I think that is very good pepper and salt, and I hope we may have some more of it.

The following paper was then read by Prof. Green of St. Anthony Park.

STRAWBERRY CULTURE.

By Samuel B. Green, St. Anthony Park.

Mr. President Ladies and Gentlemen:

I have been limited in time for this essay, therefore, I have no time for a lengthy introduction.

LOCATION.

I would prefer to locate the strawberry bed on a gentle north-east slope. The soil should be very fertile and rather open in texture, but not sandy for most varieties; though some few varieties grow best on heavy soil. The land selected should have been

cultivated in some plowed crop for at least two years to free it from the grubs of the June beetle.

MANURES.

Without doubt for the commercial grower there is no manure so valuable as well rotted stable manure from grain fed animals, which contains all the urine. And be it remembered in this connection that the food and age of animals has very much influence on the value of their excrements for purposes of fertilization. If I were going to attempt to raise a prize crop of strawberries, I would use beside stable manure an application of some ammoniated superphosphate spread broadcast over the bed early in the spring of the second year, for the reason that my experience shows it to be very beneficial applied at that time. Such a fertilizer contains much soluble food plant which can be easily and at once taken up by the plants to stimulate plant growth. I am not yet prepared to speak of special manures for this crop in as decided terms for this state, as for the states east of Ohio, for there we find the cheap potash salts are very efficient fertilizers, especially when used in conjunction with ground or rendered bone. Still, I believe, it will pay to use some of the cheap slaughter-house refuse which so largely goes to waste here at present, as a spring fertilizer.

PREPARING THE LAND.

In fitting the land I would plow at least eight inches deep in the fall, and in the spring cross-plow six inches deep, turning in a coat of well rotted stable manure, applied at the rate of ten cords per acre. The land should then be thoroughly harrowed until fine and compact.

PLANTING.

Plant always in the spring and just as soon as the young plants have their new leaves developed. Use only well rooted plants of the preceding season's growth. It may do to plant out a small bed in August for the next season's fruiting, if it is desired to hasten a supply for the home garden; but August planting is too uncertain in its results to be encouraged. The distance which the plants should be from one another will vary much with the variety grown. Some varieties are much stronger runners than others; but for a general rule I would say, plant in rows three and a half feet apart and put the plants at intervals of fifteen inches in the rows. This will insure plenty of room for the growth of most kinds.

CULTIVATION.

Keep the weeds down and the soil loose by running the horse cultivator between the rows frequently, gradually narrow up the cultivator as the plants need more room until a path one foot wide only is left between the rows. Such would be my directions for cultivating strawberries on a large area. For garden cultivation, or where extra size is wanted, it is a good plan to cut off all runners after the first few have rooted. Great pains should be taken that the bed goes into winter quarters free from weeds. In growing

pistillate varieties, plant at least every sixth row with some strongly bi-sexual kind as a pollenizer.

How long shall I keep my strawberry bed? I am often asked. To this I reply, so long as it does well, and a bed may be kept indefinitely if proper care be taken to thin it out when it becomes too much matted together. As a rule three crops are enough from one bed, after that, the bed is liable to be infested with insects or disease if not with weeds.

MULCHING,

The plants and ground should be mulched lightly in the fall as soon as the ground is firmly frozen, to protect from frequent freezing and thawing. For this purpose I prefer cut corn stalks bagasse, old wheat straw or some similar material that will lie close to the ground and is heavy enough to stay in place without weights, while it is free from weed and other seeds. In the spring the mulch should be thrown out from between the rows on to the plants after the plants have started to grow and the horse cultivator should be put through between the rows to loosen up the soil. The mulch should be immediately put back between the rows and as much as possible worked in among the plants to keep the soil shaded in the summer.

AVOIDING FROSTS.

The planting of late blooming varieties will aid in this matter. The plants may be retarded by keeping a heavy mulch over them as late as practicable; and it is a good practice to avoid late frosts in this way. Another way of protecting from late frosts is to cover the plants on nights when frosts are expected with the mulch from the rows. The coal tar smoker may also be used for making a smoke to windward which shall blow over the beds and act as a blanket in keeping the bed warm.

HARVESTING.

In harvesting, the utmost care should be used, that only good berries are put in the boxes. Keep out the green berries and pick the beds so often and so clean that there will be no rotten ones on the bed. Try to establish a reputation for fair dealing and cater to the trade of the best classes and it will be found to much increase the profits. Use the gift package and clean boxes.

VARIETIES.

In speaking of the newest varieties, I speak from only one season's experience; and, therefore, do not speak conclusively. Many of the newer varieties are of large size, and as a rule this size is only attainable under special and high cultivation. But at present the consumer discriminates in buying strawberries, and we must grow the best and especially the best looking kinds in order to control our market. There is money in well grown berries, and there is no profit in poorly cultivated beds. Still, I much doubt if there is to-day a variety grown for the market which in this state will give a greater profit than well grown Crescents properly pollenized, but they must be liberally manured to compete with other kinds.

Crescent (*Pistillate*). This standard variety I put at the head; for it justly belongs there, on account of its productiveness, ease of cultivation, hardiness, and value as a market berry. It came through last winter as well as any other berry in our collection.

Glendale (*Bi-sexual*). A very valuable, well known variety of strong growth, very popular as a market sort.

Wilson. A popular old variety that retains much of its pristine vigor in many sections.

Old Ironclad (*Bi-sexual*). Somewhat resembles the Wilson, an excellent market berry of good quality. Not prolific.

May King (*Bi-sexual*). I came to Minnesota with the idea that this variety was going to supplant the Crescent, as it promised to do in the East, but I have found it to grow here not nearly so strong nor to be so productive as the Crescent, while it is much more susceptible to drouth. It is, however, a good variety under favorable conditions.

Belmont (*Bi-sexual*). A promising variety, with oblong dark crimson berries and free calyx, sweet and good, but a little too soft for a distant market; blossoms late in season.

Bubach, No. 5 (*Pistillate*). A very strong grower, with healthy foliage; blossoms partially protected by foliage, and not much injured by late frosts last spring; flower clusters large and strong; not of high quality nor a good shipping variety, but prolific under high culture.

Gandy (*Bi-sexual*). Foliage strong and healthy; season very late; fruit stalks erect and well filled; berries large but sparingly produced.

Mammoth (*Bi-sexual*). Foliage good; berries large but sparingly produced.

Park Beauty. This is weakly staminate, and should be treated as a pistillate variety. Growth remarkably strong and healthy, producing an immense number of runners; fruits abundantly; resembles the Crescent in fruit, but its flower stems and leaf stalks are rather longer.

Jessie (*Bi-sexual*). I am somewhat disappointed in this variety. It has not fruited so abundantly as I expected. It is undoubtedly a good variety in some locations for the near market. Foliage and vigor satisfactory. This is the variety of which Mr. Davis of Northampton, Mass., raised at the rate of 1184 bushels to the acre.

Lady Rusk (*Pistillate*). This variety we received last spring from the originators, The Nauvoo Fruit Growers Association, of Nauvoo, Ill. They claim it as early as the Crescent, as strong a grower, a better shipper, and that the berries never rot but dry up. It is one of the strongest growers I know of; have not fruited it.

Warfield, No. 2 (*Pistillate*). This comes very highly recommended, and has perhaps more good things said about it than any other new variety; a strong grower. Have not fruited it.

Ohio (*Pistillate*). Much injured by the winter, and fruited but little.

While many new varieties of the strawberry are being introduced, we have not yet seen the one ideal berry for Minnesota. What we

want is a very late blooming variety, with all other good points. I am not certain but we shall get what we want some day, in the form of a strawberry that grows its fruit buds the season of fruiting. This would probably bring its season of fruiting in August.

DISCUSSION.

Mr. Harris. I would like to know why the northeast slope is the most favorable.

Prof. Green. That would be my choice of a location because it would retard the berries and they would be less liable to be touched by late frosts.

Mr. Wilcox. I would like to ask Prof. Green what three varieties he would recommend as being best for the average planter in this locality.

Prof. Green. I would put the crescent first and foremost and use for a pollenizer whatever bi-sexual variety grows best in the neighborhood. I would use the Wilson, Countess or Captain Jack for a pollenizer. I have some most excellent reports of the Wilson being used as a pollenizer for the Crescent, but I put the Crescent first and the Glendale second. There are many that come in for third place. I should think that perhaps the Captain Jack might come in there. Such has been our experience over at the station.

Mr. Lamberton. You say every sixth row for a fertilizer.

Prof. Green. I say at least every sixth row.

Mr. Wilcox. I hardly agree with Prof. Green in recommending the old standard varieties. I do not think our horticultural discussions in regard to varieties should be limited to varieties and processes of twenty years ago. I think this society is the very place in which we ought to consider some of the new and promising varieties, which promise to be a great improvement upon any of the old varieties; and it is proper that any of us who have had any experience with them should bring it out for the benefit of the public. I myself, without personal experience, but from general report, am very much pleased with the action of the Warfield, and I have reason to think it is the coming berry as a market berry, and there are several others of the newer varieties, for instance, the Cloud Seedling of the south, which has certainly supplanted all the old kinds, and in its growth is remarkable for health and vigor. I, for one, look forward to it with much hope. I hope that those who have had experience with the newer varieties will give us the benefit of it.

Mr. Harris. I do not believe that the earliest blossoms of the Crescent really need a fertilizer from the fact that the earliest blos-

soms produce fruit, and they have come out on my place perfect in variety. The old Iron Clad is too uncertain; you get a few large berries from it and that is about the end of it; the balance are not worth picking. The Countess, as you call it here, in my opinion, is one of the very best fertilizers for the Crescent. A gentleman who lives on the other side of the river from La Crescent and who raises a good many kinds of strawberries, recommends setting out about four or five rows of Crescent seedlings and not less than two rows of some good fertilizer. Then there is no difficulty in keeping the varieties separate, and it makes a good deal less difference then what you use for a fertilizer, because if you keep them separate they are all right, but if you mix a dark colored variety with the Crescent it spoils the looks of it.

Prof. Green. In recommending berries, I do not believe in recommending varieties that have not been thoroughly tried. I have one variety, the Hoffman, which has been very successfully grown through the eastern and southern states, but it is of no value here. The only way of ascertaining the value of a berry is by careful trial under similar conditions to those in which it is to be grown. I do not believe in recommending varieties after only one season's trial, however promising they appear.

Mr. Wilcox. I have much hope in the new varieties. Those that have become firmly established over large areas of cultivation and have supplanted the old varieties for market purposes, we should report favorably on. When we consider a berry, in reference to its market value, we have the true basis for its value to the people at large.

In regard to the suggestion of my friend Harris in reference to the early blossoms of the Crescent being fruitful; the Crescent is not a pistillate variety, strictly speaking, and has a large amount of pollen, which is generally developed at an early stage, and so helps to fertilize the early blossoms of itself and adjacent flowers. And not only this; the valuable quality of the Crescent and what has given its successor prominence as a market bearer, is the fact of its possessing a very perfect stigma and a very vigorous receptacle and this with a small amount of pollen often develops very perfect fruit.

Prof. Green. There is one variety I spoke of, the Lady Rusk, which has made a finer growth than the Crescent. It is very highly spoken of in Illinois; I have not tested it fairly myself. It is very prolific in plants.

Mr. Harris. I don't think we can gain anything from the ex-

perience of last year in strawberries; the crop was too light and too uncertain. The Warfield has been mentioned here. This berry is grown around Sparta, Wisconsin. I saw it in the exhibition at the Wisconsin meeting, and it was the most promising variety shown. It is as fine a fruit as can be put on the market, but still, I understand, while it is a very firm berry, it will not hold up so long as some of the softer varieties, but while it does hold up it is good.

Mr. Wilcox. I would ask Mr. Harris what way he would recommend for retarding the blossom.

Mr. Harris. The only method I know of is by mulching, after the ground is frozen.

Mr. Wilcox. Quite heavily?

Mr. Harris. Yes.

Mr. Wilcox. That process has been adopted in Michigan with the Sharpless, which it is peculiarly liable to suffer from a slight degree of cold during its blossoming period, and the most successful growers have adopted the plan of mulching heavily, after the ground is frozen, and allowing it to remain as late as possible in the spring to retain the frost in the ground, and they do not remove it until the buds have commenced to develop quite fully.

President Elliot. We cannot make much out of any experience we have had this past year, in regard to strawberries. It was a very disastrous year for all strawberry growers in Minnesota, and we are in hopes that we shall not meet with such a season again. However, there may be some of those varieties that did much better than others, which would show that they have stronger vitality, or else that they were late blooming varieties, which helped them out.

Mr. Wilcox. I would like to ask one more question. In what condition did the beds go into winter quarters; what was the prospect in the fall for good results the next spring?

Mr. Pearce. I would say that we had a dry fall, and as a general rule they went into winter quarters in rather bad condition. That was the condition in this section. It was excessively dry.

The following paper was then read by the secretary :

STRAWBERRY LEAF BLIGHT.

By M. Pearce, of Chowan.

Since the introduction of railroads throughout the civilized world, and plants, trees and seed have been received and sent from all parts, with all their diseases, insects and fowl seed, the enemies to all plants and crops have been greatly increased. At the present time the growers, unless they are fully up to the times, and

able to keep down or destroy the enemies to their growing crop, will soon be forced to the wall.

The principal enemies by which strawberry plants are liable to be injured and often destroyed, is fungus. There is one fungus more destructive to strawberry plants than all other diseases combined. This fungi is the direct cause of what is known as the Strawberry Leaf Blight Fungus (*Ramularia Zulasnei*). It is universal over the United States and Europe. It is rapidly on the increase over the Northwestern States, and, if not arrested, will soon destroy the whole of our strawberry plantations. At the present time we have but one variety that is comparatively free from this disease, and that is the Crescent Seedling, a pistillate variety, and nothing reliable to fertilize it with.

The first appearance of this disease on strawberry plants is indicated by small deep purple or red spots on the upper surface of the leaves. They rapidly increase and change to a reddish brown, and in time become gray or white in the centre. The leaves turn brown at the tips, and in a short time shrivel up and die. Whole plantations are oftentimes destroyed by this disease. No varieties are free from it, but it is much worse on some varieties than on others.

The disease is a vegetable parasite, and as much a real plant as the strawberry plant itself. The germs or spores from which they grow are dropped on the upper surface of the strawberry leaves. If the weather is warm and moist, they readily germinate, the roots enter the tissue of the leaves, and after a time mass together and send up branches from the affected parts. From the tips of those branches germs are rapidly matured, and thrown off. Strawberry plants when badly affected with this disease are soon exhausted of their nourishment and wither and die; usually, when the fruit is half grown.

There is no way to destroy this parasite when established in the foliage of the plants, without destroying the strawberry plant itself. Prevention is the only remedy. By spraying the strawberry plants with solutions which we will give further on, the germs are destroyed, or at least prevented from germinating. This parasite is precisely the same as foul seeds and seed in the soil. When both are eradicated from the soil that is the end of them until a new importation is received. For that reason the utmost care should be taken never to set a plant for fruiting affected with this or any other disease.

Owing to the difficult matter of getting plants free from insects and disease, all growers should raise their own plants as will appear further on; and to these plants to be transplanted to fruiting beds, the greatest attention and care should be given. They should frequently be sprayed with one or both of the following solutions:

Solution 1. Dissolve one pound of Hyposulphite of Soda (Glo-bular salts) in ten gallons of water. The action of this remedy is immediate, and should be applied frequently during the season.

Solution 2. In a gallon of hot water dissolve one pound of sul-

phate of copper (blue vitrol); in another vessel dissolve two pounds of ordinary carbonate of soda; mix the two solutions, and when all reaction has ceased, add $1\frac{1}{2}$ pints of liquid ammonia. When desired for use dilute to 22 gallons. This preparation should not be applied to fruiting plants. The above two remedies were taken from the Patent Office reports and we have found them very good.

To those who have fruiting beds badly affected with this parasite, if the season should be wet and warm, we can offer them but little encouragement for a good crop. They should be plowed under as soon as done fruiting, and new beds started with healthy plants as remote as possible from affected beds, or where they have recently been. A bed of this kind will not be affected the first fruiting season with the blight, but if the plants set in the new beds were diseased, pick off all the affected leaves and frequently apply the copper solution and the following year there will be little or no trouble with the blight.

A STRAWBERRY BED FOR GROWING PLANTS.

Every new strawberry grower or those who have not taken the necessary steps to grow their own plants, pure and healthy, should know that it requires from three months to a year to grow just such plants as should be set out for fruiting. Select a piece of ground that is just moderately rich. Prepare it thoroughly by plowing and harrowing, but put no manure on it. Set out pure varieties, each variety by itself, of such kinds as you intend to plant in your fruiting beds, and in such quantities as will furnish what plants will be required for fall and the following spring's planting. They should be set out about the 20th of May, 20 inches between plants, and in rows four feet apart. When planting out, remove all buds and blossoms and allow none to fruit. Give them good cultivation and by the first of August new plants can be taken from them for fall planting and also for spring planting the following year. Plants, to be most fruitful, must always be grown on poorer soil than that to which they are transplanted for fruiting. We never knew a strawberry bed to pay expenses even when the soil was good, where the plants were taken from richer soil than they were transplanted to. Keep the plants perfectly free from blight by the use of the solutions and by picking off affected leaves.

STRAWBERRY BEDS FOR FRUITING.

Select ground that is not subject to a wash. A deep strong soil is desirable, but other soils are good, such as a sandy loam. It should be where the snow will remain over the plants during the winter. For fall planting, plow deep the last of May. In about two weeks harrow fine and level, and give at once a good dressing of well rotted manure scattered evenly over the ground. Plow it under the last of July, harrow well, and set the plants the first of August. Place the plants six inches apart in the rows and the rows twenty inches apart. Set to a line, which will save much labor in cultivation. Dig the plants with a sharp, bright spade, and hasten to trim and bunch them as fast as dug. Puddle the roots of the plants as soon as bunched in a mixture of water and

red clay, about the consistency of thick cream, so that it will adhere to the roots. Plant at once. Have one person drop the plants along the line, and two others set them out as fast as dropped with a steel dibble, pressing the soil firm about the roots, with the crown of the plants level with the surface ground. If the ground is dry, one good wetting is all the plants will require. Cultivate frequently with a light five-tooth cultivator, especially after a rain, as soon as the soil will admit. If the plants are well taken care of, they will make a fine showing, and the next season will produce a crop of large and fancy fruit, such as will sell at a high price.

This is our favorite way of growing strawberries. The most of the cultivation is done before the plants are set out. They will fruit themselves to death the first year and are plowed under as soon as done fruiting. In this way, if the plants are free from disease in the start, there will be but little danger of blight or other disease.

For spring planting, the ground should be prepared the year before by deep plowing the last of August or the first of September. It should be harrowed level and smooth, and a good dressing of well rotted manure spread evenly over it the first of October. The following spring, about the 15th of May, plow again and harrow until the ground is in good condition to set the plants. Set the plants out about the 20th of May, a foot apart in the rows and rows 40 inches apart. Remove all buds and blossoms from the plants and allow none to fruit the first season set out. Handle carefully and set the plants as recommended for fall planting.

When to cultivate is a question of much importance in all crops. As a general rule, cultivation is done to kill weeds and grass, which is correct as far as it goes; but there are other and more essential causes why we should cultivate. The free circulation of the air in the soil about the roots has much to do with the growth of all plants; when a crust forms on the surface soil it stops circulation and it should be broken up at once by cultivation. This should also be done after a rain, as soon as the ground will permit. During a long or a short drouth the surface soil should be frequently stirred to the depth of two or three inches, which, with the assistance of the air will draw moisture.

In cultivating strawberry plants, care should be taken not to hill up the plants; keep the ground as level as possible. When the plants throw out runners, cultivate but one way and carry the runners to matted rows, and always keep an open space of 15 or 20 inches between the rows. Those set in the fall seldom send out runners.

Late in the fall, when the season's growth is over, give the matted rows of plants a light dressing of well rotted and fine manure, and do the same to those set in the fall, but not to those grown for plants. We consider this of great importance, which we will explain further on.

After the first permanent fall of snow, mulch the fruiting bed and the bed used only to grow plants in. Put the mulch on top of

the snow. It may be wheat straw, marsh hay, or litter from the stable; and there let the mulching remain until late the following spring; then rake it between the rows on the open space; remove the straw from the plant bed.

WHAT VARIETIES TO PLANT.

To the majority of farmers and those of little experience in growing strawberries, we would say, plant nearly two thirds Crescent Seedlings, and enough of the Windsor Chief and Bubach's No. 5 to make the balance of the two-thirds. Those are all pistillate varieties. The other third, staminate varieties in equal quantities, Wilson, Pioneer and Jersey. If any of those cannot be procured, substitute any of the following: Glendale, Countess, Sharpless or Captain Jack. To the experts in growing strawberries we recommend Wilson, Jersey, Bubach and Prince of Berries.

HOW ARRANGED ON THE GROUND.

First six rows of the Crescent Seedlings or pistillate varieties; then three rows of the staminate varieties, one row of each. Then six rows of the pistillate varieties and three rows of the staminate varieties, and so on until done planting.

MANURE.

During the past three years we have been experimenting with manure, applied to the soil and crop in various ways and forms, and the result of those experiments has led us to the belief that the most essential elements to start growth are lost to most farmers and fruit growers before and after spread on the ground. Two of the best properties in manure are very liable to waste, viz: ammonia and nitrogen; the first by evaporation, and the latter, when it comes in contact with the moist soil sinks rapidly into the ground, and if left alone, will soon be beyond the reach of the roots of the plant. How to use those two very valuable fertilizers and get the best results from both has not been fully solved. Our aim has been to save the best, and as much of the other as possible.

As recommended in our paper, by spreading the manure over the ground and allowing it to lie till the nitrogen washed into the soil, and then plowing before it got beyond the reach of the plow to bring it to the surface again, and so on until the time of the setting of the plants, and in this way not allowing the nitrogen to escape or get beyond our reach, we have had remarkable success with all crops.

A strawberry bed set in the spring or August, on soil thus prepared will contain but little nitrogen but what is in the plants late in the fall. A liberal dressing of well rotted manure at this time will furnish just the force they require for another year, and will often more than double the crop.

DISCUSSION.

Mr. Harris. I would like to ask Mr. Pearce how long he would recommend keeping a strawberry bed after setting the way he has described, on the same ground.

Mr. Pearce. I do not want any one to follow this plan because

I use it, but it is the only way on earth to raise them to perfection. I set them out in August—any time from the first of August to the first of October. I have the ground all prepared and the line set and in setting them out I let two fellows follow after me, and just put them in this puddle I have spoken of; the clay sticks to them and it does not make any difference how dry or hot it is I never lose a plant.

Mr. Harris. Will they bear the first year?

Mr. Pearce. Yes, bear themselves to death. That is my way of raising strawberries, and great big ones too.

Mr. Wilcox. Would you not get the same result by spring planting, and cutting back the runners?

Mr. Pearce. No, I would not.

Mr. Wilcox. What is the character of the strawberry root after the first season?

Mr. Pearce. It is black.

Mr. Wilcox. Mr. President: I asked Mr. Pearce that question to draw out the clear statement which he has made. It did not need any argument from Mr. Pearce, or any one else, to convince me that the true way to grow strawberries, and to grow fine fruits, is by fall setting of the plants, and the plan recommended by Mr. Pearce, if we could afford the time and expense to take care of them, is the best possible manner. I wished to draw out that statement from Mr. Pearce because I differed very materially from my friend Prof. Green as to the policy of maintaining a strawberry bed for two or three years, or a succession of years, or as long as it will produce anything. I think that maintaining a bed on the same ground for a succession of years, is one of the causes of the development of fungus and strawberry blight. I think that has been wholly settled, and if they are placed in such a condition as to produce one good crop it is all we ever need expect to get from one set of plants, and it is much better to renew or start another bed in a new position. I do not think we can emphasize that point too much because that is the main point between successful and unsuccessful strawberry growing.

President Elliot. I want to ask Mr. Pearce how much water he uses in his fall setting to each plant.

Mr. Pearce. Mr. President, I generally set out at different times, whenever I have any leisure time, and without regard to the weather at all. A half dozen buckets of water will water a good many plants. When I set them in the summer, I have a barrel of water on the ground, and with a dipper pour probably a pint or more of water upon every plant.

A member. Do you do that when you are setting the plants, or after they are set?

Mr. Pearce. After they are set.

A member. How close do you plant when you plant in the fall?

Mr. Pearce. I plant six inches apart.

A member. How far between the rows?

Mr. Pearce. Twenty inches.

President Elliot. Now, there is the point. This will do for people who are only doing it in an amateur way, but for a man who is planting out ten or fifteen acres of berries it will be pretty expensive; and I think the method of planting in the spring is preferable.

I have had considerable experience in handling small fruit, and the less time that you handle the plant and get a profit from it the more profit you are going to get. If you plant in the fall you only get fruit from that immediate plant and not from the runners after they are set. Of course you will get very nice fruit; that is all right, but the question is, can you grow fruit to be put on the market to compete with southern planters.

Mr. Pearce. I wish to add a little to that. You must bear in mind that when you plant in the spring you put them a foot one way and three feet the other way. I put three plants where you put one. I put two rows where you have one. Well, now, I am going to get more berries from one acre than you are off five acres. There is the difference. I set out five plants in the fall when you set out one in the spring; my plants are always free from disease when I set them out in the fall. If you set plants the middle of July you will have runners out two feet in all directions, and you will have a perfect matted row by fall, just as if they had been set in the spring. As I said in that paper, it is my favorite way, and I think it the most profitable method.

President Elliot. That is the point we want to get at, to produce the fruit cheapest and put it on the market at the best profit.

Prof. Green. Mr. President. I tried this method of Mr. Pearce's as long ago as 1882. Peter Henderson had recommended it some years previous. I noticed that except under very high culture I did not get good results. In Eastern Massachusetts they have tried it a good deal for the simple reason that Peter Henderson recommended it. It is not much used now. When I worked there, we fruited our strawberry beds one year, but of late years they have been running strawberry beds about three years, and most of the growers consider it the best thing to do, if the beds are healthy.

Mr. Pearce. Wouldn't it be safer, in order to eradicate fungus,

to plow up every year? Wouldn't it generally be of advantage to the growers?

Prof. Green. That is very true; whenever the beds are troubled with fungūs, we should fruit them but one year.

Mr. Wilcox. There is nothing very important I wish to state just now, but merely to touch upon what Prof. Green has said, I might mention that Auger of Connecticut has recommended it. It is a plan which I have great faith in where people will use it with sufficient care. Unless we do give the beds high culture and the best of care, we had better depend on the old matted row system. There is one advantage that might not be of so much value in Minnesota as in the east. For this class of cultivation certain varieties like the Sharpless and Jewel are best, which form single large stools and produce large berries, but whether they will do well in Minnesota, is a reasonable matter of doubt.

Prof. Green. (To Mr. Pearce) Are your Crescent Seedlings troubled with fungus?

Mr. Pearce. They are, but not seriously.

Prof. Green. Have you any beds two years old?

Mr. Pearce. No, all strawberries are affected and each year are becoming more so. It is only a matter of time, if we don't take it in hand, before it is going to drive us out of business. It has already driven hundreds out, and they don't know what the matter is. They say it is sunburn. We must get right down to the bottom facts and find out what we are going to do. It is in our power to head this disease off and raise fruit, and good fruit but it must be done intelligently. It is the easiest and simplest thing in the world to do if you go at it in an intelligent way. The disease is a parasite, and in a very short time will take all the nourishment out of the plant. But if we use the solutions I have named, and as I make them, there is no question about healthy plants. Have no fungus or anything of the kind on your plants and put them on a good, clean bed, properly prepared and you will grow plants that are perfectly free from the disease.

President Elliot. I don't know but we have carried this discussion as far as we can with profit and as far as our time will permit. The next paper on the program is currants, which we will take up the first thing after dinner. Dr. Frisselle has a pretty good article I think and we would like to have it listened to by as many as possible. I have a paper on gooseberries from Mr. Strubler, of Illinois. In regard to this, I wish to say that while going through our markets and commission houses in Minneapolis last summer I ran across some of the finest gooseberries I ever saw on the market.

There were not a few baskets, but forty or fifty of them. I inquired of the party who it was that had them for sale and he said he was one of the best growers there was in Illinois. I procured his address, and this fall I wrote to him asking him if he would give us a short paper on gooseberries, and he has kindly done so.

GOOSEBERRY.

By Phil. Strubler, Naperville, Ill.

To grow gooseberries to perfection, the soil should be well enriched with stable manure about the same as for strawberries; they like plenty of food, and the more they get, the better they thrive.

We find a clay loam, well enriched, the best of all soils for the gooseberry, but any soil will do when properly enriched and cultivated.

Propagation. We propagate principally from layers by bending down the limbs from old bushes and covering them with rich soil; they will readily take root and make fine plants. Some varieties grow readily from cuttings, such as the Houghton, Smith's Improved, etc. All varieties of coarse heavy wood will not readily grow from cuttings.

Planting. We plant in the fall of the year, every time, when we can. The gooseberry starts so early in the spring that the best of the growth of the season is lost when planted in the spring.

We usually plant in rows five to six feet apart and three to five feet apart in the rows. Strong growing kinds, such as the Downing and Houghton, and some others, should be set not less than four to five feet in the rows, and rows not less than six feet apart. Such as Champion, Whitesmith, and Smith's Improved, and a few others of dwarfish growth, can be planted nearer.

Cultivation should commence early in the spring, as soon as the ground is in good condition, keeping the ground well worked and clear from weeds until frost. We use a cultivator and one-horse plow for this purpose; in using a plow, we are careful not to plow deeper than three or four inches so as not to disturb the roots of the growing bushes.

Pruning—This is of great importance, and right here is where most people fail, in not pruning enough. Don't be afraid to prune until you think you have nearly ruined the bush, especially after they have borne fruit several years, and the bushes are inclined to become old. A good rule is to thin so that the branches are six inches apart, and not more than from four to eight stalks should be allowed to grow in a stool or hill; also the ends of bushes should be cut back each year from one quarter to one half of the previous year's growth. Unless pruned annually the fruit will become smaller from year to year.

Varieties—We are frequently asked what varieties of gooseberries are the best, or which would you plant. If we were to plant for market, we would plant first Champion, Downing and Houghton in the order named; if for home use, Downing, Puyallup Mammoth, Champion, White Smith and Industry. Downing is a

fine berry, most too tender for long shipment when ripe. Champion is the best shipper of them all.

Puyallup Mammoth is one of the largest berries of them all, and is an American seedling, a vigorous grower, color light green when ripe. Downing is medium to large in size, being light green with a bloom of the same color when ripe; a very vigorous grower, one of the best; also an American seedling.

Champion, also an American seedling of medium to large size, color same as Downing without the bloom; bush of dwarfish growth, an immense bearer, one of the best shippers; origin Oregon.

Whitesmith is an English berry, a good bearer, light green when ripe, large size, rather of a dwarfish growth, a good bearer. Sometimes subject to mildew.

Industry, large and of recent introduction; an English variety, one of the largest, but is liable to drop its leaves; this would do well on high land on a northern exposure in a clayey loam soil.

Houghton is an old variety, too well known for further description, it is a good shipper, immensely productive, but too small.

NUMBER OF BUSHELS TO THE ACRE.

We have grown 250 bushels to the acre. Perhaps it is safe to say 100 to 150 bushels is an average to the acre. Last season we picked from bushes that were planted in 1884, sixteen quarts to the hill; the bushes were so heavily laden with fruit that they lay flat on the ground.

Prices are up and down the same as for other fruits. They usually bring from two to three dollars per bushel; and I have sold them as high as four dollars.

The kinds discarded by us as unworthy of cultivation, are the Mountain Seedling and the Smith's improved. The former is a very large bush of quite large sized fruit of inferior quality, and a very shy bearer; the latter a very fine berry, a small bush, a very shy bearer, and with us not very hardy.

Seedlings.—For many years past we have been in the habit of growing seedlings from the best varieties, and it is astonishing to see the different varieties produced from the same seed. We have succeeded in getting some very fine berries from these seedlings of all colors in which the gooseberry grows; some green, white, red, purple and yellow; some of large size, some medium to small, but nearly all of them better than the old Houghton.

We expect in a few years to produce a berry that will beat them all for size, productiveness, hardiness and bearing qualities. Not excepting the English varieites which of course do nothing in this country.

President Elliot. Here is a short article from Mr. Gust. Malmquist, gardener of General Washburn, on Seedling Gooseberries. Perhaps we had better have that read next and then we will discuss both papers.

SWEEDISH SEEDLING GOOSEBERRIES.

By Gust. Malmquist, of Minneapolis.

A few years ago, disgusted with the small gooseberries I had so far seen here, I thought I would try how foreign gooseberries would succeed here if raised from seed, as I knew that imported plants soon succumb in this climate. So I sent to a friend in Stockholm for the seeds of the two kinds mostly grown for market purposes over there. One kind, large, smooth, green, and used for eating; the other, red and hairy, used for preserves and always picked half ripe. I received the seed in September and planted it the same fall. The next spring fully five hundred plants came up, from which I selected a few and gave away to some friends, and kept a few myself. This summer both kinds fruited and the fruit was fully twice as large as the America seedlings grown side by side, and the bushes just as thrifty and healthy looking, with no sign of mildew so far. I believe the experiment will prove a success.

DISCUSSION.

The President. Now, if you have anything to say in regard to any of these points that have been brought out here, we would like to have them expressed.

Mr. Barrett. I suppose that experience is now in order, isn't it? My experience is somewhat limited. I have been trying to raise Downing gooseberries for three or four years. I find it not so hardy as the Houghton, and as to its bearing properties it is decidedly below par; it kills back in the winter time when I don't properly protect it with straw. This last year the Downing bore slightly on the under branches, but the Houghton leads the van with me. My experience is that the Downing is not so hardy a plant as we need in my section of the country.

Prof. Green. Isn't it worth protecting?

Mr. Pierce. The great drawback to growing gooseberries in this country is that there is such little demand for them. We have raised them, but they are the worst drug we get on the market. With us, they do not have ready sale, and a great many have become discouraged. If the gooseberry would sell in Minneapolis as readily as the strawberry or raspberry, we would grow it. There is no difficulty in growing the gooseberry, but the profit is what we are after.

The President. If it will pay Mr. Strubler to ship his gooseberries to Minneapolis, would it not pay us to produce them and market them at home? That is the question. There is one point that I want to call your attention to, as Mr. Barrett has struck the key-note of the whole thing, and that is in regard to growing the Downing. The only way we can grow the Downing in this country, is to protect it. It is just as easy to protect as currants and black-

berries. Just lay it down and cover it. This has been demonstrated by those who have had experience. (I refer to Underwood & Emery, of Lake City.) They have been experimenting in covering gooseberries and they find it pays them to do it, and by using good common sense in the operation it can be done very cheaply. I know from the experience I have had in growing gooseberries and currants, that year after year in succession when I did not get any fruit the reason was that the beds were injured in the winter. We must go into this theory of protection more than we have; we must use it in a practical manner, and as we are here to bring out these facts I hope you will give us some discussion.

Prof. Green. It seems to me that the key-note of the whole gooseberry question rises in the variety we can sell. You see how carefully Mr. Strubler manages his bushes. I do not believe there is a man in Minnesota that takes as good care of his bushes as this gentleman. In regard to protecting them, it is the easiest berry we know of to protect as it is not necessary to cover them completely.

Mr. Pierce. Why are gooseberries unpopular?

Mr. Harris. Sugar is too high.

The President. I presume that is one reason. I suppose that none of you here know that the gooseberry is the healthiest fruit you can use. A gentleman who had dyspepsia told me that he had received benefit from the use of the gooseberry when he could not get it from medicine. He says that it is one of the finest fruits that anyone can use who is troubled with that disease.

Mr. Wilcox. Do you know of any effort being made by parties here to improve our native seedlings?

The President. We don't need to. I hope we shall take this discussion up later and then we will treat it in its proper course when we get to native fruits.

Mr. Pearce. Mr. President, I have been experimenting a good deal and reading up, and I think our fruit growers should give more attention to the enemies of fruit than they have heretofore; I think this is of the utmost importance. The mildew on gooseberries is a fungus. If there is any one thing that I consider of vast importance, which ought to be agitated by this society, it is the study of the various enemies by which our fruit is liable to be destroyed. When those things are understood we can go on intelligently and know just what we are doing. It is not only the strawberry, the gooseberry, the grape and the apple, but you cannot name a fruit that grows today but has dozens of enemies to subsist upon it. The time has come when fruit growers must be

more scientific than they have been heretofore if they wish to succeed.

Mr. Wilcox. What enemies has the gooseberry?

Mr. Pearce. Why, the fungus.

Mr. Burnett. I would like Mr. Pearce to give us a short description of this fungus that attacks gooseberries.

Mr. Pearce. I am not posted on that; I am more especially on the grape and strawberry. I think Prof. Green can give us that.

Mr. Burnett. My Downing gooseberries do not kill back.

The President. They will not kill back, but they will bear no fruit.

Mr. Burnett. I thought Mr. Barrett said they would kill back.

The President. Did they bear fruit?

Mr. Burnett. Not very much.

Prof. Green. I cannot now give the life history of the gooseberry fungus. I have succeeded in treating it sometimes very successfully. The mildew that forms on the gooseberry is not so insidious a thing as the red rust of the raspberry or the grape rot. It can be destroyed by dusting the plants with flowers of sulphur.

Mr. Pearce. I would use for the gooseberry a solution of sulphate of soda.

Prof. Green. Why not use Bordeaux mixture?

Mr. Pearce. That would do.

President Elliot. I want to state just now that our secretary, Mr. Hillman, on account of sickness in his family, will not be able to be here, but he has secured a stenographer to come here, who will take notes of the discussions, and we will have to dispense with Mr. Hillman's valuable services and get along the best we can. It will be necessary for us to have a secretary pro tem, and I would suggest that some one make a motion.

It was moved, and seconded that Prof. S. B. Green act as Secretary, pro tempore. Carried.

AFTERNOON SESSION. TUESDAY, JAN. 21, 1890.

The meeting was called to order by President Elliott.

President Elliot. We were to take up the topic of currants the first thing this afternoon; but Dr. Frisselle is not present and we will therefore have to pass that, and will call upon Mr. Pearce to talk to us in regard to growing small fruits for profit.

Mr. Pearce. The red raspberry has been our most profitable crop for several years. In order to make this fruit a success, there are a few things very essential: First, soil and its preparation;

second, varieties; third, the right kind of cultivation at the proper time; fourth, winter protection.

Raspberries are adapted to any good, dry soil, high or low, as they blossom late and are not liable to be killed by frost. At the same time they do the best on a clay soil. Previous to planting, the ground should be summer plowed, the last of July, and a moderate dressing of manure applied, and ploughed again and thoroughly harrowed in September. Mark it out, if convenient, north and south, in rows at least eight feet apart—nine is better. Plant after the 15th of October, three feet apart in the rows, and press the soil firm about the roots. With a sharp knife, shorten the canes within one inch of the ground. No mulching of any kind is necessary when the plants are set in the fall. The following spring, the first season, can be planted between the rows, one row of any kind of a hoed crop, such as cabbage, beans, potatoes, etc. Give the plants good cultivation with cultivator and hoe. Allow about three canes to each hill and destroy all the others. Any time after the first of October, before the ground freezes, the plants can be laid down. The rows should run north and south on account of the prevailing wind in the summer from the west. The laying down is done by loosening the ground about the roots on the east side of each hill, with a spade or fork; then with the hands or a two-tined fork, press the canes as flat on the ground as possible. It is sometimes quite difficult to keep the plants down with dirt. In such cases, place a little marsh hay, or something of that nature, about midway of the plant when down and throw a few shovels of earth on top.

If the plants are large and bow up and leave an open space between them and the ground, we have, for several years, filled those spaces up to the canes with earth. In this way we protected our plants for several winters and never failed to get a good crop of fruit. Recently we have been using coarse manure over the roots and lower parts of the canes and find it works well and greatly increases the crop. Either way is good, but the latter is the best unless the soil is rich. The extreme tops of the canes are not covered, as those are cut off with a sharp spade before the canes are raised up. The amount of cutting depends on the length of the canes; usually from six inches to a foot. When this is done we lift up the canes with a fork that has several tines, placed under them. We do not place them in an erect position but allow them to remain at an angle of about 50 degrees. Never cut or pinch the tips of the growing canes in the summer as this would make the stalks stocky and cause them to throw out laterals which would make it bad about putting them down in the fall.

As soon as the plants are lifted from their winter protection, we drive stakes twenty feet apart in the rows on the same angle as the plants. The height of the stakes depends on the length of the plants—usually from $2\frac{1}{2}$ to 3 feet above the ground. On those stakes we string a telegraph wire and hold it in its place, on the upper side of the stakes, with staples placed over the wire and driven about half their length into the stakes so that they can be drawn out when the plants are to be put down in winter. Bear in

mind that the plants are not put down lengthwise in the row, but just the opposite, at right angles from the row. With the stakes, wire and cane, as suggested, all will be, when fruiting, on one side of the row, disconnected from the growing wood, which greatly increases the quantity and quality of the fruit and makes the picking much more rapid than when the fruit, canes and new wood mingle together. As soon as the wiring is done start the cultivator and level and mellow the ground; follow with the hoe and level and hoe about the hills. Surface cultivation should be kept up during the growing season, once in ten or twelve days; especially if the season should be dry. Cultivation will overcome drouth and it is often necessary to continue it through the picking season. As soon as the fruiting season is over remove the old canes and burn them. Of the red varieties we like the Turner and Hansell for early, Cuthbert for late.

Of the Blackcaps, we like Souhegan for early and Gregg for late.

As yet we have but one choice in blackberries, and that is the Ancient Briton. The above plants are all grown by us as we grow the red raspberry. Growing fruit of all kinds in Minnesota requires correct and careful thought and everything done at the proper time. Success or failure depends upon the grower.

DISCUSSION.

A member. I would like to ask if you cover the whole cane when you lay them down.

Mr. Pearce. I do not think it is necessary. I put dirt about midway. I get them as nearly flat on the ground as I can, leaving no space between the raspberries and the ground.

A member. I tried it last year but the stalks came from four to six inches from the ground and I covered them up about half way.

Mr. Pearce. You don't understand me. I cover them partly with manure, using good stable manure. It will pay one hundred per cent in the crop to thus cover and manure them.

A member. I would like to ask Mr. Pearce to explain more fully in regard to that wire.

Mr. Pearce. That wire is stretched under the plants and when they fruit they will come right down to it; they lie right on that wire; they don't get to the ground.

A member. You place the wire on one side of the rows?

Mr. Pearce. Just one side. I don't say that is the best way; it is simply the way I do it, and I am having very good success in raising raspberries, and am going to increase my grounds largely.

A member. What varieties would you use in blackberries?

Mr. Pearce. I think the Ancient Briton is best. The stalks are not large and will not break when you turn them down, whereas, if you undertake to lay down some other varieties they will snap off.

A member. In the summer at the time of fruiting is there never danger of the new growth taking the sap from the root, so that you lose your crop if you don't pinch back?

Mr. Pearce. I have never had any trouble in that direction. My plants lie down on the ground almost flat and when my new canes come up I keep them down to what they should be.

Mr. Wilcox. I think he said that his red raspberries did not suffer from disease. I was not aware that our red raspberries ever suffered any variety of disease.

Mr. Pearce. Oh, yes.

Mr. Wilcox. Well, I should be happy to know what disease they ever suffered from.

Mr. Pearce. There is a decease among raspberries where the leaves all turn up.

Mr. Harris. The aphid?

Mr. Pearce. No, it is fungus.

Mr. Harris. The leaves have a rusty appearance and crinkle up?

Mr. Pearce. Yes.

The following paper was then read by Dr. Frisselle of Excelsior.

CURRANT CULTURE.

By Dr. M. M. Frisselle, of Excelsior.

None of our Northern fruits can boast of a more ancient lineage or hold a more permanent place in the esteem and affection of the people than the currant. Its agreeable acid juice adds a refreshing element to the cool drink of the fevered patient, and the housewife's stores can in no sense be called complete that does not embrace a generous supply of this fruit, preserved in cans or as jam, or converted into the staple delicious article—currant jelly. For every reason this healthful fruit should be abundant in every household and in universal use everywhere, as it thrives in almost any location and will endure more abuse and ill treatment than any other fruit.

None of our small fruits respond more promptly and more abundantly to kind and generous treatment than this, and no fruit is more sure of a ready market at remunerative prices. Currants among fruits are like muslin among textile fabrics, or sugar among groceries. They are staple goods always wanted, and the market is never known to be glutted with this fruit.

But the real question implied by the title of this paper is, how to successfully cultivate the currant, and in this discussion I shall take the liberty of drawing largely upon my own experience. The Ribes family to which the currant belongs is rather a large one, including at least forty members. It is a native of Europe, Russian Siberia, and the northern parts of North America. The name

currant seems to be derived from Corinth from the similarity of the fruit to the Corinth raisin or small grapes, of Zante, which are known as Corinthians or Currants. The three varieties best known and most largely cultivated are the *ribes rubrum*, *alba*, and *nigrum*—the red, white and black. The red is the universal favorite, although the white is by many preferred for table use on account of its milder flavor. The black currant has some reputation as a domestic remedy in some quarters, but is comparatively little known and less cultivated. There are a number of sub varieties both of the white and the red currants, mostly of the latter. Of the former we have the White Grape and White Dutch. Of the latter we have the Red Dutch, Victoria or Cherry, Stewart and the Long Bunch Holland, etc.

Propagation is most readily accomplished by cuttings, though it is easily done by layering. The former is the most usual method. The terminal portion of the new growth, of six or eight inches in length, should be taken off in autumn after the leaves have fallen, buried in well-drained soil to the depth of four or five inches, with the lower or butt end uppermost. In the spring, as soon as the soil can be worked, a deep loam should be selected, well plowed, and made smooth and firm by the use of the harrow, then marked off into rows thirty inches apart. Along the rows a trench should be made six inches deep and the cuttings planted eight or ten inches apart in the row, care being taken to pack well the earth about the cuttings, leaving the terminal bud two or three inches above ground. A mulch of strawy manure should be scattered over them to prevent the too large escape of moisture, and to prevent the sun from burning the young buds. All this work should be done as early in the season as possible, as the buds of the currant are among the earliest to start, and delay would endanger them in the process of planting. A large proportion of cuttings thus treated will become thrifty plants for the next year's setting in permanent positions. In order to the best results in a permanent plantation, currants should be planted in a deep fertile loam with a subsoil of yellow clay well enriched with plenty of stable manure. The ground should be nearly level, but with enough inclination to afford good drainage. Before planting, the ground should be deeply plowed and well pulverized and the plants deeply set and given plenty of room. The large growing varieties as the Cherry and Long Bunch Holland should be planted at least six feet apart each way. This may seem to some almost like a waste of land, but a few years of growth will demonstrate its wisdom. Five years since I planted 1000 bushes of the cherry variety, four feet apart each way, and now when they are in leaf it is difficult to get around among them. There should always be sufficient room so that they can be cultivated by the aid of a horse without injury to the bushes. Some of the smaller growing varieties, as the Red Dutch, could with propriety be planted five feet apart each way, still I think six feet the better distance. In order to the prosperity and profit of a currant plantation, it should be kept well cultivated and absolutely free from weeds, grass, clover etc. It is a delusion to believe that currants can be successfully grown among grass, weeds, and bur-

docks, along a stone wall or even a rail fence. They want the open field with plenty of air and sunlight. The better the culture, the better the fruit, and the better the fruit, the larger the market price, and the difference between \$2 and \$4 per bushel is the extra margin, which the careful grower gets for his good work.

A currant plantation does not arrive at full bearing till the fifth year from setting and does not require much trimming till the third year and then only, such branches are to be removed as is needful to give the bush a comely form. The size of the fruit may be much improved by removing in June a considerable portion of the new shoots that spring up from the roots—enough, however, should be left to furnish a proper supply of bearing canes, and it should be borne in mind that the new canes do not produce much, if any fruit until they are two years old. By removing a portion of the new growth, more air and light is admitted and the vital force of the plant is directed more to the fruit and less to the making of new wood.

The currant is a great feeder, and as it is naturally inclined to produce a large crop every year; it requires constantly a liberal supply of fertilizing material to keep up the vigor of the plant. Nothing is better for this purpose than a generous amount of stable manure supplemented by a few quarts of wood ashes to each. This matter of furnishing a good supply of plant food should be conscientiously attended to every year, or the grower will find that he will be punished with poor fruit and little of it. There is no danger of over-feeding the currant. With my little plantation I frequently make a compost of the droppings of my chicken-house with muck, and apply about the bushes. With regard to trimming, good practical judgment is important in deciding what old wood should be taken out and how much new should be left.

As I have before said, little trimming will be necessary till the fifth year, at least none of the old wood will need to be removed before that time. When currant bushes are treated with a liberal supply of manure, there will be a great tendency to send up new shoots from the roots, and enough of these should be removed to secure the admission of plenty of air and sunlight while enough are left to fill the places of the old stalks removed. A large portion of the growth of the currant bush up to the fifth year, will be in extending its branches, at which time it will have acquired full size and will produce a full crop.

With regard to marketing, it is safe to say that none of our Northern small fruits possess better qualities than this. It grows well out of the reach of earth or sand thrown up by violent showers, and it can remain on the bush for days, or even weeks, without injury, after it is ready for the market. Harvesting should commence as soon as four-fifths of the berries are colored, as the partially ripe fruit makes the firmer jelly, though it lacks somewhat of the finer flavor of fruit fully ripened. As this fruit is chiefly used for making jelly it is desirable that the plantation be made up of varieties that ripen at different periods, as the Red Dutch for an early variety and the Victoria or Cherry for later

ripening. The current carries well to market, but in order that it be not bruised or crushed, it should not be put in packages of more than a fourth or a fifth of a bushel. Let it be gathered with care without leaves or other litter, put in nice, tidy, well-covered packages, and the market will always take it at a fair price. If the currant plantation is properly cared for, then, like the vineyard, it shows little disposition to exhibit off years. No one of our small fruits is less affected by changes of temperature, by drought, or excess of moisture, by early or late frosts, than this; and it requires no protection even in this climate; so that taking one year with another none yield more sure returns. From about 1000 bushes I gathered this last season 92 bushels, which yielded, often paying all expenses of picking, baskets, expressage and commission, \$212. Comparing it with grapes, raspberries or strawberries, and taking into account all the labor and risks of production, I think it equally profitable with them.

To recapitulate—To make currant culture a success, plant mostly the larger varieties. Give plenty of room for air and light. Feed plentifully with stable manure and wood ashes. Keep clean and free from weeds and grass. Do not hurry the harvesting. Send fruit to market in clean packages of moderate size, and free from leaves or any thing that may detract from the good appearance of the fruit, and the results will be satisfactory.

DISCUSSION.

President Elliot. You have heard this most excellent paper. Now, if there are any points or questions that you wish to ask, I presume the Doctor is willing that you should go to work and pick it to pieces.

Mr. Barrett. I wish to ask the Doctor what quantity of ashes he puts on a hill.

Dr. Frisselle. I think you can hardly put on too much. I have been in the habit of manuring my bushes every fall, giving them a liberal supply of manure, and digging around the roots in the fall of year. Have followed it during the summer with two or three quarts of ashes just as I happen to have them. I used what wood ashes I had.

Mr. Barrett. One season I put about a bushel of ashes around each of several hills, and it killed out all the grass and weeds. While my neighbors failed, I had profuse crops of currants year after year. All the ashes we had, we put upon those plants, and while my neighbors' plants were infested with the currant worm, mine were entirely exempt.

Dr. Frisselle. I knew a man who had some currant bushes that he thought were useless, and he took occasion to throw a quantity of ashes around them, covering them up more or less. In the spring he cut out the old bushes, by the advice of, I think, the

president of this society, and the result was there were sent up from among those ashes many young shoots which did remarkably well. They went on bearing much to the disappointment of the owner, and pleasantly disappointed every body.

Mr. Barrett. Is it not an antidote for the currant parasite?

Dr. Frisselle. I don't think I would say that. I think all vegetation that is in vigorous, active condition, resists all parasites and resists all diseases more than weak, feeble plants. Perhaps it would not keep off the currant worm, as that is a vigorous enemy that goes almost anywhere.

A member. What kind of ashes do you use?

Dr. Frisselle. Use wood ashes only.

President Elliot. I would ask the doctor if he detected any difference in the quality of his currants. If I remember rightly, a part of them were Stewart seedlings and part Red Dutch.

Dr. Frisselle. They were nearly all of them the Victoria or cherry currant, and a small part of them were Red Dutch.

President Elliot. Which was the strongest grower?

Dr. Frisselle. The Victoria, by all means.

President Elliot. Now, there is one point I want to call your attention to in regard to making currant cuttings. Dr. Frisselle recommends cutting them in the fall and burying them with the butts up. Another way is to have the ground prepared at the time you are making cuttings in the fall, and plant them where they are to remain and grow the next year, so that the tops will just be level with the surface of the ground. In the spring take a light rake and stir the soil a little around the cuttings. This will not injure the buds and it helps much. The doctor said they did not require protection. That has been the usual method of growing currants, but we find in late years we have lost several crops of currants by not having them covered. Those that have protected their currants say they are almost sure of a crop.

Dr. Frisselle. During the five years my currant plantation has been set out it has every year done well. The snow has some seasons been very deep and covered it up.

President Elliot. The Doctor is very nicely situated. He has very fine water protection, so that he has no danger from late frosts in the spring. There is one other matter I want to call attention to, and that is in regard to ashes. Those who have made the closest study of fertilizers tell us there is nothing that we can use on fruits, strawberries, gooseberries, or anything else, that is a better fertilizer than ashes. If, instead of throwing our wood ashes in the road-way, we should scatter them over our strawberry beds we would have better crops.

Mr. Grimes. It is a very easy matter to understand why the soil does not freeze deep near these lakes. I remember a number of years ago I went out to survey a piece of land, and after we were through we went out on a small island in the lake, that was covered with very nice little trees. The next morning I thought I would block out some of those plants, and upon going there with our tools we were surprised to find there was no frost around them, although the ground everywhere else near the lake was frozen to a depth of several feet. We dug them out and took them home. Well, my theory is this: When water freezes, as a matter of course, heat must be drawn out somewhere, and the ice not being porous the heat must escape through the nearest soil into the air, and that I concluded was the reason this land wasn't frozen; the heat escaped from the water into the soil.

President Elliot. Were these trees mulched with leaves?

Mr. Grimes. No, I don't think they were much. There might have been some leaves gathered there, but not any great quantity.

President Elliot. It is a fact that in heavy timber where there are three or four inches of leaves on the ground we hardly ever find any frost in winter. If there is a light snow fall in the fore-part of the winter, you will find, as a general rule, that the soil is not frozen very deep.

The following paper was then read:

ECONOMICAL FORESTRY.

By Mr. Barrett, of Brown's Valley.

What I am to say now is not my own personal observation or experience, but something that has been told me by a gentleman with whom I am personally acquainted, and who is reliable in every sense of the word.

I have had a large experience during the brief period I have been in the West, in raising forest trees; and I discover there is a lamentable dilapidation in many of our tree claims, despite the faithful work of the owners, as best they know how to discharge their duties.

I have a tree claim which is now in its fifth or sixth year, and it certainly has cost me all that farm is worth to develop ten acres to a proper degree.

Recently I had occasion to be present at an Indian council, at the reservation near Browns Valley, and had a conversation with the Indian agent, William McKusick, who is an intelligent man, and has had considerable experience in raising wood; he said there was a method, which he defined to me, and cited Mr. George Port

of Millbank, South Dakota, as one who would corroborate his statement. Mr. Port is traveling agent for Wood Bros', agricultural machinery, and has been careful to observe everything of the kind. He said in substance that a gentleman who owns a tree-claim in South Dakota (who I think is an eastern man and very intelligent), had endeavored to copy nature in the development of a forest. Accordingly he had ignored to a great extent the letter of the law, and followed his own dictum in reference to method. He cultivated his ten acres four successive years before he attempted to develop trees, and each year he went deeper until the fourth year he got down to the depth he wanted which was over a foot if not 18 inches. In the fourth year he turned the weeds under where they were in blossom. Late in the fall, just before the ground froze up, he dragged his ground, as he would for corn, a great many times and pulverized it. Then he mixed a variety of seeds indigenous to his climate, box-elder, ash and I think some maple which he sowed broadcast with his hand, as we used to sow in the old fashioned time. Then he put on his drag and dragged it thoroughly. That is all he ever did to his tree-claim. The next season those seeds grew up very thick and had a struggle during summer against the weeds that over topped the little things but they survived. They were of course very small but were in a comparatively healthy condition. He let them grow. The next season there was quite a competition between the weeds and the young trees, the third year the young trees began to gain upon the weeds; the fourth and fifth years they towered above the weeds and over-shaded the weeds and grass, so that nothing of this kind could grow under. He never used a hoe or cultivator and in due time he made application for a charter. Of course he had to swear that he hadn't followed the letter of the law but there were the trees of a superior kind, and many of them; and on the strength of that, Uncle Sam gave him a charter. He writes me that they are the best trees he ever saw in the West, being tall, symmetrical, beautiful and of a superior grade of forest trees. That is the substance of what was written me by Mr. George Port, and it is corroborated by Mr. McKusick.

I thought these facts were of sufficient consequence for us to have a deliberate consideration over, and I hope you will criticize them as they require it, and see if in your opinion they should be put upon record. If it can be carried out in practice, why, only conceive what a vast amount of cost will be abridged, and what success we will have in developing forests all over the Northwest. Of course it is a disadvantage to us fellows who are engaged in selling trees.

DISCUSSION.

Mr. Miller. Do you know what variety of trees those were?

Mr. Barrett. He had ash, and, if I remember right, he had sugar maple.

Mr. Miller. What kind of ash?

Mr. Barrett. Native ash.

Mr. Harris. That method of starting a forest is very near to

nature's method and we have no business to criticize its way. Now, wherever you find forests, that is, good, substantial forests, they have not been set by the hand of man, and if men want to forest this border country they must keep out prairie fires and confine themselves just as nearly to nature's methods as possible. A great many years ago I was called upon to speak on this forestry question, and I made the same statement which I have just made in your presence. When I settled down upon my place there was a little prairie there. For two years I secured my hay upon it. Hazel brush sprung up in little patches, and by means of blue jays carrying seeds, in about five years, oak trees, and hickory trees, were springing up all over that prairie. I purchased the land since and it cost about \$20 an acre to get out that crop that nature had planted there, and among it were some of the finest specimens of red oak and young hickories you will find in the state of Minnesota. Now, I think if nature could have been left to herself she could have spread this forest half a mile or a mile a year. Take, for instance, the timber in Fillmore county. That hasn't been planted by the hand of man, but it has come there by this same blue jay process and such kinds of things, and I believe there is a good deal in the theory Mr. Barret has mentioned as developed by a Dakotian, in mixing a large number of varieties and sowing them thickly. The trees that are set out by man must be somewhat crowded together as a kind of protection, otherwise they spread themselves out near the ground and either become crooked trees or so full of knots from the ground up as to be useless as lumber. I have no doubt the weeds that grew on this plantation the first year were beneficial. There were not enough of them to smother the trees out, and they afforded a protection from the sun along in July and August, which helped them to survive.

Mr. Pearce. Mr. President: I think there has been a good deal of error in regard to planting trees on tree-claims. I think thousands of dollars have been spent with no profit resulting. I think the only way to grow forests is to grow them from seeds, and the paper read by Mr. Barrett is a good one.

I have experimented a good deal with different varieties of trees that cannot be transplanted. The oak cannot be transplanted. You can gather a bushel of seeds and plant them in the fall, and they will grow in the spring and make a forest; when you take all these seeds and put them on the ground thick and let them grow up, the weak will die and the strong will live. Now, that is universal the world over. There is only one tree out of a hundred that ought to be planted. When you sow seed the weak die and the strong live

and will continue to live, and from all my experience and observation, wherever the seed has been put in the ground, success has been the result. I would say to any man who has a tree-claim: prepare your ground, buy five or ten dollars worth of seed and go at it in a business way. It applies to all trees, evergreens, and everything else. It is the correct way.

Mr. Gaylord. Does anyone know what season of the year gray ash seeds are fit for planting?

Mr. Pearce. The seeds drop just before the leaves fall. First the fruit drops and then the leaves.

Mr. Miller. I have had some little experience in planting the European larch. I plant them as you would nursery stock, about eight feet apart and from two to three feet apart in the rows. I cultivate the rows the same as corn, and they grow very rapidly and strong and straight. As soon as they begin to crowd each other I thin them and use the thinnings for railroad ties. Not only so, but the timber is said to be quite as durable as red cedar, and if such is the case I don't see why the Dakota man wouldn't select that timber. You can get them for about a dollar a thousand, boxed and shipped.

President Elliot. Those would be seedlings. I would not advise anyone to take anything less than trees three years old.

A member. When you get them planted out they grow fast and straight. They don't warp at all, and as they grow upon each other the good have nothing but a small bunch of branches at the top. I have them in my ground now that are 60 feet high, some of them, and as straight as an arrow.

President Elliot. I see here a gentleman that has had quite extensive experience in cultivating tree-claims. I refer to Mr. Folsom, whom I shall call upon to give his experience.

Mr. Folsom. The suggestion advanced by our friend, Mr. Barret, is a good one. It is about the right thing. It hit the nail on the head, and is the first suggestion that ever looked exactly feasible. That deep plowing was the secret of the success in that little tree-claim. A gentleman in Sioux Falls told me that during the war, or just before, he was digging a well and had got down sixty or sixty-five feet when it caved in, and as he couldn't secure water, he filled it up again and planted a row of trees, one tree being just where this well was. How large a tree do you suppose he raised there in eighteen or nineteen years? He said it overran seven feet in circumference. Now that is so much for deep plowing.

Mr. Folsom then spoke at some length regarding the injustice of the present tree-claim law, and concluded as follows:

I have very little faith in raising trees now unless this government will back us up. It occurs to me that we had better put ourselves on record immediately, before we go home, by a series of resolutions covering the ground that has already been defined, making a demand on Congress so and so. There is a tendency on the part of our Congressmen—and they don't know much; they don't know as much as we do, for what we know, we know by hard knocks. Now, these Congressmen have proposed to repeal the timber culture act simply because certain men have betrayed their trust, and others have had ill-luck and have changed the tree-claim to preemption. This timber claim law, with all its defects, has resulted in some good to quite an extent over the west, and without it we would not have gained the position we now occupy.

I make a motion that the chairman appoint a committee, if the committee is not already chosen, and instruct said committee to present our views upon the question that we are analyzing, and put it upon record and also have it published in our daily papers and sent to our Congressmen.

The people of Minnesota and the people of the Northwest are looking to the action of this body. We are quite conservative; we base our calculations upon our experience, and what we say has an effect upon the people at large, and if we put ourselves upon record upon that point it will have a salutary effect upon our Congressmen. I make that motion.

Mr. Harris. I second the motion.

President Elliot. I would like to state one or two points in regard to this discussion, that it may go on record before the motion itself. The great success of that man spoken of, was just as Mr. Folsom said, it was his deep cultivation through four years. This is where they have all failed. The Northern Pacific, when it first started, began to grow trees along its line. They only just turned up a furrow and put the cuttings in, and thought they were going to make a success of growing trees that way. The consequence was they lost every tree, not one tree in five thousand grew; whereas, if they had gone to work and prepared their ground, they would have met with better success.

There was a point, too, brought out in regard to little trees being overrun with weeds. Now, that deep cultivation gave a chance for root growth. The soil was in condition to take up the moisture and retain it just the same as a sponge would, and while those large weeds were overtopping, they were going down to get root growth, and each successive year, as time went on, they kept gaining on the weeds. That is the reason that man met with success.

There was a point that Mr. Pearce brought out in regard to planting trees; it was that the best would survive. It is the survival of the fittest with everything, not only with mankind, but with the vegetable kingdom.

Anyone who has had experience in growing trees knows that there are a great many trees which are crooked, ill-shaped and unthrifty. It is thrifty, straight-growing trees that always succeed. These are points I wish you would consider.

Now, in regard to this motion. I think it would be well to put ourselves on record.

The resolution was carried, after which the following committee on forestry resolutions was appointed by President Elliot:

J. O. Barrett (Chairman), F. H. Folsom, J. T. Grimes.

REPORTS FROM LOCAL SOCIETIES.

Mr. Barrett read the following report of the Lakeside Horticultural Society:

REPORT OF THE LAKESIDE HORTICULTURAL SOCIETY.

By Jerome G. Todd, Secretary.

The Horticultural progress in this part of the state is by no means discouraging. The few individuals, who in the early settlements ventured to raise fruit plants, are succeeding better than at first. The droth last summer severely tried our plants, but there was not any marked damage. Of course the crop was meagre. Appreciative farmers are more earnest in growing wind breaks around their buildings and gardens. On the shores of the Big Stone and Traverse lakes the crabs are doing better than farther back on the prairie.

The demand for young forest trees is increasing. Evergreens rightly managed are proving a success. Raspberries, gooseberries and currants are beginning to reward the hand of the judicious cultivator. Blackberries are not yet sufficiently tested to warrant a positive report. They survive the winters when properly cared for. Thus far thievish boys and birds have been pretty well supplied with our small fruits and plums. If they are honest enough to tell the truth, I think they will say fruit raising about this city is quite a success. Dewberries endure the climate well; the depredators can better say whether the yield is good.

The annual reports of the State Society are highly appreciated. We feel quite confident there is to be a new impetus given to our work. Through these reports and the doings of our society there is about to begin a horticultural revival of religion.

Mr. Wilcox. Mr. Chairman: I hardly know in just what form to put it, but I wish to say that there was organized a year ago a State Beekeeper's Association that voted to become auxiliary to the State Horticultural Society, under the constitution, and while several of our important members are laid up with sickness, and the secretary is not here, I have complied with the requirements of the Horticultural Society, and have handed to its secretary a short report and list of members. I am a little uncertain what course should be taken by this society, but I thought it would be well to receive such kindred societies as would come under our constitution as auxiliary societies, and so define their status. I would move that the Beekeeper's Society be received.

President Elliot. I think it would be better not to receive the motion now, as a committee has been appointed to look into the matter.

CORRESPONDENCE.

The following communications were read :

SOUTH HAVEN, MICH., January 1, 1890.

S. D. Hillman, Secretary, etc.

MY DEAR SIR:—I am indebted to you for a copy of the programme for your annual meeting, to occur at Excelsior, on 21st to 23d inst.

Since my visit to your state some years since, and the acquaintance then formed with a few of your leading horticulturists, I have not ceased to feel a special interest in the society and its deliberations; hence, I the more regret that it is not convenient or even practicable that I should attend.

The winter here, is, so far a very exceptional one. A few inches of damp snow fell the last of November, but disappeared within three or four days; since that time the mercury has ranged from 40° to 60°; it has been down to two or three degrees below freezing only two or three times, till yesterday morning, when it showed 21°, for the first time this winter. This morning the mercury is 47°, and raising.

The result, so far, is, that the fruit buds of the peach are already considerably enlarged; in some cases, even showing the color of the petals. This occasions grave fears for the safety of the coming crop of this fruit; since the occurrence of even a moderately severe paroxysm of cold would find the incipient bloom illy prepared to withstand it.

Well, should we be unable to supply you the accustomed contingent of peaches next year, I trust you will accept the will for the deed, and hope for better things in the future.

With confidence that your meeting will prove a profitable and enjoyable one, I remain

Very truly yours,
T. T. LYON.

OTTAWA, January 15, 1890.

S. D. Hillman, Secretary, etc.

MY DEAR SIR:—I thank you for your kind invitation to attend your meeting in Excelsior, on 21st to 24th January. I regret that other engagements will prevent me from being present, and sincerely hope that you may have a pleasant and profitable occasion.

Yours, very sincerely,
WILLIAM SAUNDERS.

OTAY, SAN DIEGO Co., CAL., January 13, 1890.

Minnesota State Horticultural Society.

We send greetings, and an olive branch as a token that there is a green spot on earth yet, and thirty-four kinds of flowers picked from my garden today.

Yes, they were grown in a hot house, 100 miles square, with naught but the bright dome of heaven to keep the frost out.

I would sooner live here in a hut, thatched with tulæ grass, than to live in Washburn's palace, and have *I scream* six months of the year.

G. S. WOOLSEY.

Mr. Gaylord was then introduced to the meeting, and asked to give a report of the last meeting at Waverly. He replied that he had not had time to make a written report, as he had not received his credentials to their meeting until a day or two before, which was entirely occupied in making preparations necessary for leaving home, but would say:

Our meeting at Waverly was one of interest but with a small number in attendance, particularly was this true as to the citizens of Waverly, who were out in very limited numbers.

Some very interesting papers were read, one by M. E. Hinkley, of Marcus, Iowa, on the black spruces he had secured from the Black Hills, exhibiting some very fine specimens of young trees.

R. P. Speer, refusing to act as president another term, J. C. Ferris, of Hampton, was unanimously elected for president for the ensuing year, and Elmer Reeve, for secretary; vice president, C. H. True, of Edgewood, and Norman Reeve, treasurer.

Some very interesting articles were read on the tree agent laws, one in favor of more law, by J. C. Ferris; one opposed to the Minnesota law, by E. M. Sherman, and a number of others both pro and con.

During the last evening the society was given a first-class literary entertainment by the professional teachers, and high school scholars of Waverly, displaying an unusual degree of thorough training which made the evening's exercises eminently successful. Well may Waverly be proud of their professor.

It might be well to add the society recommended for the Russian list the Hibernial and Lieby, adding for a general list a number of the old varieties. Our state secretary, George Van Houten, responded after the close of the school entertainment with an address both able and sublime, showing a master's work by a master's hand.

Mr. Burnett, of Manitoba, was then introduced, and said:

Mr. President and Gentlemen:

In my wanderings to and fro I have been called upon to address meetings upon divers subjects, principally political, but never expected to have the honor of expressing my views in public on horticulture, for the reason that I have no views on horticulture.

I have come 600 miles for the purpose of getting all the information I could on the subject. We have no horticultural society in our country. There are a few "cranks" like Mr. Frankland and myself. I should imagine we are about the same as you were 25 years ago—imbued with the idea that fruit could be cultivated in Manitoba, notwithstanding that it is getting away up pretty near the arctic circle.

It is not our Manitoba winter that prevents our growing fruit. We sort of blame you Minnesota people. You will persist in sending us occasionally, especially last summer, some of those hot winds. If you would only send them in the winter time we would not blame you so much, but in the summer time we do, because it stops us, to a great extent, in raising fruit. Notwithstanding that, we have been trying to get our supplies from a state like Minnesota, which is claimed very much resembles our own. The generality of farmers have the idea that getting stock from New York, or Florida, is about as successful a way to grow fruit as getting it from Minnesota. I don't think so. The proof of the pudding is in the eating. The farmers in Manitoba have been at it in a small way for the past seven or eight years but without success. For my part, as I said before, I am only a novice; have been at it only four or five years.

We have some native plums which have stood the winter very well. So far as small fruit is concerned, I have been quite successful in raising them. In apples we are not able to do anything at all. Have tried crab apples, but they don't do well; but still I am going to persevere and see if I can't make it somewhat of a success.

Mr. Gaylord. How about the Russian apples? Have you tried them?

Mr. Burnett. The government has started an experiment station and there have been some put out there, but we do not know what the result will be.

Mr. Barrett. Is the Canadian government doing anything for forestry?

Mr. Burnett. Nothing whatever. We don't actually feel the want of trees up there that you do here. Where I come from, it is broken—hilly.

Mr. Barrett. Do farmers take interest in forestry?

Mr. Burnett. Very little indeed.

Mr. Gaylord. Tell us some of the best plums that you have.

Mr. Burnett. We have three kinds. I have the three kinds

growing near my house. None of them are very good. We have the largest kind there, but it is not good to eat. We just use it for preserving.

President Elliot. Your native raspberries are the same as our native raspberries here, the common red raspberries?

Mr. Burnett. We have two kinds; two kinds of red ones. One with a smooth stalk and one with a prickly stalk.

President Elliot. Are they both fruitful?

Mr. Burnett. They seem to be very irregular in bearing. One year they have a good stalk and the next year none at all.

In reply to questions, Mr. Burnett also said that they had any quantity of black currants and high-bush blueberries, but no blackberries. Gooseberry bushes grew large and bore very heavily under cultivation. The berries were smooth and very small. He had never seen any native crab apple trees, but they had ash, soft maple, hard maple and elm trees.

The meeting then adjourned until 7 o'clock P. M.

EVENING SESSION.

TUESDAY, JANUARY 21, 1890.

The meeting was called to order by Vice-President J. O. Barrett, of Brown's Valley.

A solo was rendered by one of the young ladies, entitled, "The Best of All."

Dr. Perkins then gave a very cordial and able address of welcome to the members of the society, which was responded to by Mr. Grimes.

RESPONSE TO ADDRESS OF WELCOME.

By J. T. Grimes, Minneapolis.

Ladies and Gentlemen of Excelsior:

The pleasant duty and privilege has been assigned me, on behalf of the State Horticultural Society, of Minnesota, to respond to the warm reception and cordial welcome which you have extended unto us, through your fellow-townsmen, the genial Dr. Perkins.

We are not surprised at the reception given us here today, for we meet not as strangers but as friends, who have a mutual interest in the advancement of horticulture in all its branches applicable to our own State and the Northwest. Some of the very best horticulturists within our councils, are citizens of your town, and we

feel proud to make the acknowledgment here today. "By your fruits ye are known." Not only is the reputation local, but abroad as well, are the fruits of Excelsior and Minnetonka known. In the exhibit of fruits made by this society at Philadelphia in '76, and in which you took a prominent place, the question was there asked me if I would be so kind as to tell by what secret process we got that beautiful finish on our fruits?

At the last meeting of the American Horticultural Society, held in California, when the subject of grapes was under discussion, President Earle called upon me to inform them how we grew such fine grapes up there in Minnesota, as he saw on exhibition at New Orleans? Of course I did not tell them, those grapes were all grown round about Lake Minnetonka.

Not only have you been successful in the production and growth of fruits, but your skill in scientific horticulture has been carried out in the work of adorning your homes, and making them attractive and pleasant. Brother Gould has been *guilty* of producing some of the finest roses which I have ever seen.

There is no better index to culture and refinement than we see here round about us. The stamp which you here affix, will upon the future of your village remain indelible.

But, then, there is something more behind all this, which we have not yet noticed. I remember in 1855, Minneapolis then boasted a population of 300 ⁽¹⁾ on the west side of the river, and we made it a business to look after strangers and take them in. We could then show our immense water power in all its native wildness, and point out the natural advantages that would eventually build up a city of 100,000 people. Our conservative Eastern friends were a little slow to see the grounds of our prophetic vision, and we, ourselves, were a little distrustful of our own statements. But then, we welcomed everybody, and still welcome them, and herein was the secret of our success and development.

Do not understand me to say that your delightful village will ever make as large a city as Minneapolis, but, then, you will soon *grow into* Minneapolis as St. Paul is now doing.

What could be more beautiful, more enchanting, than that pure sheet of sparkling water, which you call Minnetonka? What secret delight the view inspires? Our hearts beat with high satisfaction as we pour out our congratulations upon the tenants of those rural village homes. Look out around you, upon the sloping woodlands, the little hills, the fruitful vales, the flowery lawns, and call them, if you please, all your own! Only let me remind you that others have a delight in them as well as yourselves. What mean those beautiful cottages erected along the shores, and used only as summer resorts? Wealth, beauty and refinement here congregate for a season and make gay the Saratoga of the West.

We are here as your guests today, and you receive us with a royal, old-fashioned welcome. We come to do honest work for the benefit of the whole State, in the interest and in the advancement of horticulture, and while we claim to be aggressive, are not com-

bative; our only weapon is the amber cane, but when we marshalled our forces and came in sight, and found that you had already hoisted the white flag, we left our *Cain* behind. (²).

But then we have along our reserve force of invincibles, under the command of Brother Wilcox, "Company B," composed of the most ingenious chemical operators who have discovered the rare and valuable secret of enriching themselves without impoverishing others; who extract the most delicious sweets from every fragrant herb, without wounding its substance or diminishing its odors, and at the same time distributing and mingling the fruitful pollen so as to generate new varieties of fruits, flowers, grains and vegetables. True, these allies of ours are only semi-horticultural or high-breds (hybrids), as my friend, Mr. Gideon, would say, but are, nevertheless, very excellent in quality and valuable auxiliaries to our work. The moral application here defined would seem to be, success succeeds; but merit surely wins.

And, now, Mr. President, in your behalf, and in behalf of our visiting members present, and the fraternity at large, again allow me to tender our sincere thanks for the invitation given, and the welcome so cordially bestowed upon us, assuring our worthy Excelsior friends that it is our desire to cultivate the acquaintance so happily begun, that when we leave you as a representative body, we shall individually cherish and hold in our affections the most pleasant memories of the past.

Note (1). Minneapolis has now a population of over 140,000.

Note (2). It has been the custom of the Amber Cane Association, heretofore, to meet with us at the annual meeting, but at the present, the Beekeepers Association have taken their place, and will occupy a part of the time in discussing subjects connected with that industry.

President Elliot then read his annual address :

PRESIDENT'S ANNUAL ADDRESS.

Members of the Minnesota Horticultural Society; Ladies and Gentlemen:

Excelsior, whose people are overflowing with hospitality, *has honored our Society* by extending to its members entertainment and a very cordial invitation to hold our 23d annual meeting at this place. This pleasant lake-side town, with its graded streets, hotels, banks, stores, beautiful churches, schools, vine-clad cottages, and inviting commons, little resembles the hamlet of half a dozen log and board buildings surrounded by heavy forest growth that I found on my first visit to this place in the fall of 1854. Pardon me if I refer to that long dreary ride and its impressions, as we wound our tortuous way on a cold December day,

over the crooked roundabout road along the shores of lakes and through marshes, over hill and dale, through the black oaks and thick hazel underbrush, colliding with grubs and stumps continually; jading our stage horses as they travelled up and down steep hills, taking the whole long day to accomplish these twenty-eight miles, the shortest way from Minneapolis, if I remember correctly; but now so delightful a drive with its easy, smooth, graded road-bed, that I have driven from this place to Minneapolis in two short hours. I was then a rosy-cheeked boy, full of ambitious anticipations, having my first experience of pioneer life; and our early impressions are said to be the most lasting. The one incident of that eventful trip more prominent in my mind than any other, which I still remember with pleasure, was the open, hearty, kindly greeting of the only landlord in the place, Mr. George Galpin, as my friend, Mr. Horace Shepley, and I turned our tired horses up to his hospitable doors. How changed now; (not the hospitality to friends, for that element was deeply rooted in the hearts of this people) but the scenery and landscape, the heavy forest growth of lofty maples, elms, black walnuts, butternuts, baswood and other smaller growths, have disappeared before the sturdy woodman's ax to prepare the ground for the fruit trees, vines and small fruits that now adorn every hill side and grow in such plenteous luxuriance in this beautiful, homelike, suburban village.

The Excelsior of to-day, with its motto "Still Higher," "Ever Upward," said by one of its pioneer settlers to "possess almost everything that the heart of man could wish for," is what its preserving, energetic, enterprising, hospitable people have made it by combined effort, one of the most homelike, beautiful summer resorts on this lake, renowned for its bays, promontories, peninsulas, islands, capes, splendid fishing, its many villa-houses and picturesque spots.

Kind friends, we would like to stop and dwell upon many other pleasant things that could be said about this truly delightful health-giving resort and its people, but time will not admit, and we pass on to some of the graver questions which we have assembled from far and near to consider.

I trust all have come with the desire to interchange thoughts and compare experiences, modes and methods of developing our industries, fraught with so much importance to all the people of this great state. Many of us have had in the past high ambitions and great expectations, but I think our ardor has been sometimes dampened by the icy fingers of the cold north wind of winter and the scorching drouth of summer. Practical acquaintance and continued and varied personal observation have taught us some things of real worth and value; but we also find there are other problems bearing upon the future development of the fruit interests of our State, that are at present requiring our closest attention. What we *would* do and what we *can* do, are two very different and difficult problems to meet in all their intricate bearings. I hope you will give fair, wise and judicious consideration in the advancing of new theories on all questions under consideration. If there are

those who have strong preconceived notions of what can and ought to be done, there may be others who are "doubting Thomases" with fears about the wisdom of introducing certain new, untested varieties presented for trial and favor. The unfavorable experiences in many instances of our best informed horticulturists cause many to look with disfavor upon the introduction of Russian apples to the exclusion of the best of our most hardy seedlings. While on the other hand, there are those who greatly desire to try all things new offered, and the last presented for favor is the one in which they have the greatest faith. I believe our only road to success is by experiment! Experiment!

The only way out of this difficulty is to continue sowing seed of the finest specimens, of the longest keeping and hardiest native, or foreign varieties. By this means we shall *finally attain* a degree of success. From all the reports I can gather, I conclude we shall not derive the immediate benefit that many expect by planting largely of the Russian varieties.

Our State is situated latitude 43-30° and 49-24° North, and longitude 89-39° and 97-5° West. Its extreme length North and South is 380 miles and its breadth varies from 180 miles in the middle to 262 miles on the Southern and 337 near the Northern boundary. The area of land is 50,335,367 acres—of water 3,608,012 acres, or a total area of 78,649 square miles or 53,947,378 acres. This area occupies nearly the center of our continent, and is the highest land between the Gulf of Mexico and Hudson's Bay. This elevated plateau is one thousand feet above the sea level and forms the water-shed for the three principal rivers of our continent. Within this large area are very many beautiful lakes, from one to thirty miles across, on the shores of which and along the banks of our numerous streams are many suitable picturesque sites for homes, orchards, vineyards, and small fruit gardens, from which an incalculable supply of wholesome, nutritious food will be produced when improved by persistent, patient, industrious horticulturists.

If we consider our State geographically we shall find it is situated on the northernmost limit of successful fruit culture, unless our Manitoba horticulturists should develop to the contrary. In the southern tiers of counties, the apple (*pyrus malus*) grows quite abundantly; in the middle or interior counties, near very large streams and other bodies of water, it is successful to a limited extent; while in the northern half of our State it is almost impossible to grow it with any degree of success. Thus you will see there is an actual necessity for dividing or districting our State into three or more distinct divisions, with the pomological work so arranged, that the people of each of these separate parts shall derive their full share of beneficial instruction. As we develop our experimental work, doubtless we shall find many varieties of worth and value, adapted to cultivation in the southern that are wholly unfit to grow (except as an experiment) in the northern part.

Therefore, I think it would be well for our Society to consider the advisability of selecting a committee of experienced persons

to prepare special lists adapted by acclimation to the different sections of our State. When you consider the great difference in climate between the extreme southern and northern tiers of counties, I think it will show plainly to all that *whatever* recommendations *we make* for each section should be carefully considered.

It would be well for you to further consider what are the most feasible means and through what instrumentalities can we disseminate the knowledge that is so much needed to give encouragement and help forward the interests of horticulture in all portions of our state. Also, what particular lines of horticultural industry needs more than all others our present undivided, wise and judicious attention. It is apparent to those most intimately acquainted with the needs of the people that we, as individuals and as a society, should give larger scope and breadth to our work, that the masses may derive a greater amount of instruction and benefit from our experience and teaching. You, as members of a progressive organization, should seek always to keep in the foremost educational ranks in matters pertaining to horticulture, and aid and assist with your dearly bought experience in formulating corrective laws for guarding the inexperienced and unskilled beginners in horticultural pursuits from imposition and fraud and a wasteful expenditure of their substance on worthless nursery stock of no value in this climate.

There has been a question raised by some of the citizens of our state, (I am happy to say they do not belong to this organization) whether the members of this society were putting forth the energy and effort they should for the advancement of horticulture in all its various forms, and whether the people at large were deriving benefits adequate to the amount of money drawn from our state treasury, and expended yearly for our expenses and printing our annual reports. Healthy criticism or honest critical judgment is all right; but when it comes from professional critics and fault finders, particularly without cause or reason, it gives but little alarm to the members of an organization who are trying to do faithful, effective work in contributing to the development and prosperity of the horticultural interests in an honest and judicious manner. If our efforts for the improvement of these great interests are not appreciated by some (a few—not many) of the people of our state, the commendation and praise we receive from abroad by those rendering the same service in similar lines of duty, and qualified to appreciate the difficulties by which we are surrounded, compensates in a measure for this constant censoriousness. To err is but human, and he who can do or say aught that shall not be criticised by some one, must be possessed with endowments bordering on the divine. Where is there another organization in our state that can show a better, clearer, more effective record of honest purpose and effort, or one that has put forth greater zeal or ambition to overcome the impediments, obstacles, difficulties and hindrances that have environed our every action. Our intentions have been honest and upright, if our accomplishment of good results have not been all we could desire. Our members, like

hose in other similar organizations, have not been at all times as active and energetic in pushing investigations as could have been wished, and we have lost many golden opportunities for producing desired results, but let these adverse experiences be a guide to more decided action in the future.

Oliver Wendell Holmes has said, "that no man is so old but that he expects to live a year." The true horticulturist with love and enthusiasm implanted in his breast, is never so old but that he expects to live *long enough* to reap a benefit from whatever he plants, and success in horticulture is for those only who *will* devote energy and enterprise with continuous application. It is a calling in which no lazy or indolent person will thrive. Persistency under discouragement is one of the essential qualifications most needed by all who expect to succeed in this extremely cold climate. There is not a true horticulturist so old or so well versed in the art, that he will not try something new each year, even though the mysteries of growth and development are beyond his human perception. None are so wise but they can learn something new each day. We are all children in understanding the intricate laws of nature or what constitute the elements of hardiness in this locality.

Hardiness or capabilities of endurance with certainty. This quality of all others is what the apple-tree growers have been seeking the past quarter of a century, and the vital question that even now perplexes and discourages amateurs and the veteran in pomology alike, is, shall we ever produce fruit trees with vigorous organisms sufficient to withstand the vicissitudes of this variable temperature in the most *favorable*, and unfavorable of locations. When we think we have mastered this problem, and in our own minds have solved this intricate question in growth by hybridization and cross fertilization to produce hardiness, productiveness and ability to bear all kinds of exposure to our intense climate, old nature comes along with a new and peculiar problem that upsets all our finely adjusted theories and established facts. Thus it has ever been in the past. It will always be so in the future, *unless* we acquire more accurate insight into the law of development, and use greater skill with closer inspection of the first principles of propagation. A noted writer aptly says: "Nature's laws alone are eternal and unchangeable, and, therefore, they alone are authority. The opinions of man are as chaff unless they conform to those laws, and it matters not how long certain opinions have been held, if they are formed in conflict with the laws of creation. Instead, the very age of an error is its strongest condemnation; for in this period of increasing knowledge he has no excuse who is so wedded to preconceived notions that he will not learn the unerring facts, which proves his opinions to be but simply baubles." A large proportion, we might say nearly all the failures of our horticulturists, are attributable to their careless methods, and ignorance of the first principles of plant growth. They have disregarded some of those unerring principles that govern in some particular point, consequently they have imperfect methods, and a chief cause of failure with many is a want of acute, accurate observation, or that use we make of our senses in acquiring that very

essential art of taking notice, seeing or fixing the mind upon anything seen or heard—the act of recognizing and noting all the peculiar facts or phenomena as they occur in nature.

One of the questions for our present consideration is, are we doing all we *can* to enlighten, instruct and assist our members and those interested in agricultural and horticultural pursuits? What more efficacious means should be adopted, eliciting a greater desire among our people to develop all our horticultural resources?

What we need at the present time is *more* method, *more* system, *more* push, and energy displayed by all our members in carrying on their different classes of horticultural work. Special lines of work need appropriate organizations to develop *their* particular interests. The nursery men have *their* little hobbies that they wish to place in the foreground on all occasions. The florists have their peculiar methods for advancing *their* interests. The small fruit and vegetable growers should have *their* societies for developing their greatest prosperity. And the relative position of the State Horticultural Society towards all these kindred organizations should be as conservator for blending all their individual industries into one broad central organization, where we can mutually work and annually come together to make common cause for our just rights; discuss plans and methods for widening and broadening our usefulness as progressive, industrious conservators of horticultural instruction for the masses.

The following clipping illustrates plainly:

“THE INFLUENCE OF ORGANIZATION.”

“The ordinary individual, no matter what his station in life may *be*, can have *little*, if any, influence on the public policy of the country. Some single persons, enormously endowed with that which ‘makes the mare go,’ may exert much power, but such are not ordinary individuals; they are extraordinary, and the power they wield is usually for the worst interests of their fellowmen. It is only through organization that the common honest masses can in any way promote the public good. Our agricultural and horticultural organizations and conventions *can*, if they set their heads to the work, secure the passage of such laws as the public good requires. Largely attended popular assemblages have a dignity and force about them that will attract the attention and compel the respect of even the demagogues who are disposed to respect a movement according to the number of votes it can command, and if it ‘speaks out’ its voice is more apt to be heeded than the disjointed mutterings of many times the number, acting separately, and speaking, each man for himself. The Grange, the Alliance, Farmers’ Institutes, Horticultural and Life Stock Societies, are each powerful for moulding opinion in right channels, and they cannot fail to exert a powerful influence upon the country.”

We are cognizant of the fact that in the past we have had great opposition from some sources and many natural difficulties to overcome, but the greater the resistance the more energy and exertion

we should put forth to overcome the opposing forces, and if possible, gather new impetus and increased facilities for disentangling some of the intricate problems with which we are beset. What we need just now more than any other *one thing*, is a greater harmony of purpose in all the horticultural industries of our State ; a more united effort attained, if possible, by setting aside the unfavorable attitude that each holds to the other, and settling all petty, hostile animosities and oppositions, by bringing together in a more friendly union all the special interests represented ; thus, by commingling all our purposes and desires we give added strength to our endeavors, and increased prosperity to all classes of horticultural industries. And our own influence for good in our several pursuits will be greatly increased if we unite and make concerted effort, and all work zealously and energetically together, for in union there is greater strength assured. When either of our interests are assailed, we should make common cause under one banner, without any narrow views or selfish partisan motives arising, to inscribe upon the future pages of our horticultural history something worthy of all individual and collective efforts.

United, we shall make steady and rapid advancement; divided, we shall make but slow progress; with union, we shall become a strong, progressive, energetic organization, with enlarged facilities for doing a great and noble work. No narrow, one-idea policy ought to preclude our discussions and deliberations. Anything that tends to divide or dwarf our common interest in horticulture should be ignored, and all rise in our aspirations to a higher, broader plane of effective usefulness. An each-for-himself motive is not what we should adopt, cultivate or encourage. In many ways, what is the interest of one is common cause for all, and each special industry should strive to co-operate as far as possible to harmonize the desires and interests of all horticulturally inclined. If we act well our part and use all our talents in a persevering, wise and judicious manner, the prospect for the future development of the fruit, flower and vegetable industries will brighten as the years go by.

STANDING COMMITTEES.

All persons receiving and reading our horticultural reports would, on seeing the great number of committees, naturally suppose we were reaching out in nearly all directions for information. It would be near a reality, *if true*, that each member performed the service assigned to him in a faithful, commendable manner; but with all the inviting and urging your executive officers can bestow upon each individual to perform his special duty, we come far short of getting at the facts, experiences and information desired. Either our system of selecting persons to fill these positions is deficient, or there is some fault somewhere; and we should adopt some better method—have less committees and more work performed, or do away with this committee business altogether. If there is any honor or public esteem attached, as Wadsworth expresses it,

"Say what is honor? 'Tis the finest sense
Of justice which the human mind can frame,
Intent each lurking frailty to disclaim,
And guard the way of life from all offense
Suffered and done."

Then the one filling the position should feel a personal necessity of imparting whatever valuable information he possesses to the members of our society, and through our reports to the people of the state. I know of no other way of deriving benefit from committees except through their prepared reports, and as there is no possible way of obtaining this knowledge and experience intuitively, we must seek it through their personal exertions.

Practical instruction for the masses in horticulture should be the greatest purpose and desire of all the members of this Society, and if we would meet with any degree of progress, we must diligently improve every opportunity for developing the educational facilities in this particular line of industry, and this can only be attained by continuous, persistent, industrious endeavor on the part of all connected with this organization.

We are taught, "It is line upon line and precept upon precept," followed according to right and thoughtful instruction, that makes us proficient in any calling. I would therefore recommend that a suitable committee of three be appointed to consider and decide what course of action would be advisable in the revision of the list of standing committees and their appointment.

CENTRAL EXPERIMENT STATION.

There are some matters connected with this Station of great interest and importance to the members of this Society and the people of our State that need our special attention.

If it be true that there is a feeling with certain persons that the horticultural experiment work is not called for—is too expensive for the benefits derived from this class of investigation, and is devoid of much value—whoever they are, or wherever this opposition comes from, we pity their shallow perceptions and want of foresight. In no other department is there greater need of efficient and extended experiment. If there is any State in these United States, that has a growing necessity for horticultural development, it is Minnesota. Everything that is most beneficial and useful in tree, plant, fruit, or vegetable, does not grow spontaneously in this climate but needs constant, persevering, fostering care to bring to perfection. And we need all the aid and help that science and art can give to assist in developing its horticultural resources, that our people may derive the benefits from this class of instruction, that those more favorably located, receive from these experimental Stations.

The time is coming, and not far in the future, when it will not be all wheat; wheat; or all cattle, horses and hog, that attract the attention of our people and lead in the volume of our productions, but a greater diversity of crops will be the necessity, then the de-

velopment of horticultural pursuits will become popular and be looked upon with more favor. The cutting off of this department at our Central Station would be a most suicidal policy for the interests of horticulture in this State.

No! no! We as horticulturists cannot and will not submit to any such treatment; we must have a horticultural department and it must not be an insignificant affair either. It should be one of the best equipped and manned at our station. If there is any one particular division in our Central Experiment Station that needs the closest watchfulness for the next few years, it is this department.

One of the first questions to be considered is, how much and what facilities should be sought for developing our several special horticultural industries. The superintendent of this department has repeatedly called the attention of individual members to some matters of great importance that need timely looking after by our society,—one of which is the starting of an arboretum.

In his last report the superintendent hoped for an appropriation sufficient to make a beginning with that class of work, but there was a lack of funds or of interest, on the part of the Board of Regents, so the work is virtually no further towards a beginning than a year ago. There are some other lines of work of not so important a nature that could be laid over for the present and this much needed enterprise undertaken. Every year lost now will be felt more and more as the experiment work progresses, and there should be no delay in giving this very useful feature a prominent position the coming year. This is a class of work that takes years to develop its worth, unlike some others of quicker growth, therefore it should be commenced at once.

Another question that relates somewhat to the financial support of the station is this: Shall the various products be sold to partially help pay expenses, of production, and in that way be put in competition with our farmers and gardeners?

I am well aware that in starting any new enterprise of the magnitude, and with as many divergent relations and interests as are here represented, all requiring immediate attention,—the question often arises in the minds of those having the direction and distribution of the several departments in charge, which are most urgent and require the first care.

As horticulturists, looking at what our needs are from our particular standpoint, with our preconceived ideas, of course, we can see only the necessity of immediate and prompt action being taken to develop those special lines of work that will give the greatest impetus to the horticultural interests of the state. While on the other hand, there are those of other industries that think their lines of work should have first place. Each are more or less interested in whatever is of value to the others in developing the true prosperity and success of all the different industries, with all their varied interests, and should work together for the greatest good to the greatest number.

OUTLYING EXPERIMENTAL STATIONS.

The benefits we are deriving from our sixteen outlying stations is comparatively very small, and we are not receiving the amount of experimental knowledge we should. And can it be expected to improve with the present system of volunteer service under the exclusive management of those in charge. The reports are very meagre and of little value as indicators of what is valuable for planting in particular localities. Either from lack of ability of the superintendents or their inactivity or indisposition. The first we hope is not true, if the two latter, there should be a change of some kind made.

Last year we had reports from the central and two out-lying stations. This is not enough, and some remedy should be devised by our executive committee for paid service and getting more reports of value.

I do not wish to weary your patience by saying too much upon experimental work, but Professor Taft, on the value of this class of work in Missouri Horticultural Report of 1888, has given some very grand points on "Needs in Experimentation for the Development of Horticulture," that are equally applicable to Minnesota. He says:

First—Seed testing. "This will be of great importance not only to the horticulturalist but to the farmers of our state. If it is known we have a station to test seeds, it will have a tendency to a restraining influence preventing seedsmen sending out old and worthless seed. Not alone the germinating qualities should be tested, but the purity of the seed should be examined. This station should also be a seed control for the state, then the seed dealers would take more care in breeding, selecting and sending out good, pure seed. The testing of all novelties in vegetables and fruits could here be done at much less cost to our farmers than in the old way of each buying for themselves. Those of value could be ascertained and the worthless discarded. Testing of the new novelties in fruits and vegetables should be one of the duties required at the station and as fast as their value is ascertained, the synonyms weeded out, and all seeds, plants and scions of promising varieties sent to approved parties in different parts of the state, who will test them on their soil and in their climate, and report to the central station, whence the results can be sent out to the people, thus saving the fruit and vegetable growers from wasting their money in buying high-priced, worthless plants and seeds, and a year's trial work.

The testing of new varieties of shade and ornamental trees, shrubs, vines and evergreens, should be made a valuable feature of the work. Hybridization, originating of new varieties and the improvement of old ones, new methods of preparing the soil, new machines, new methods of cultivating, planting, pruning and managing different crops; the using of fertilizers in various forms and ways in the production of certain crops, and in addition to this work a new and almost unoccupied field is open for testing the

effect of plant food of various kinds on the quality of fruits and vegetables."

He further says: "The real value of experiment stations to horticulture will depend fully as much upon the fidelity and intelligence with which the horticulturalists make use of the results of the experiments, as upon the real work done by the stations."

The attention of the members is called to the adopting of some feasible plan for cultivating the finest of our native fruits ; giving encouragement to those growers who will develop and bring into notice and use any kind having real deserved worth that will add value to the horticultural productions of our State.

The following letter received from H. E. Vandeman, pomologist to the U. S. Department of Agriculture, will explain what I mean more plainly than I can give it. It is as follows :

U. S. DEPARTMENT OF AGRICULTURE, }
OFFICE OF THE POMOLOGIST, }
WASHINGTON, D. C., DECEMBER 26, 1889. }

Mr. Wyman Elliot, President Minnesota State Horticultural Society, Minneapolis, Minnesota.

DEAR SIR: Your letter of recent date to the secretary of this department has been referred to me. In reply I will say that there have been no special investigations made in the Northwestern states during the past year, of a pomological nature, except those made by Prof. T. V. Munson and C. L. Hopkins, who were acting under special authority of the Department in connection with the work of this division in looking up the wild fruits. Their report has not yet been published ; but when it is, all the correspondents of this division, and especially the members of the State Horticultural Societies will be supplied with copies.

The improvement of the wild fruits is a subject that has been long claiming my attention, and in Minnesota and adjoining states there are no doubt many fruits which may be developed into very useful varieties, under cultivation. This is especially true of the wild plums, and nearly all of the small fruits which are found wild in that region. If I were to make any recommendation to the members of your society it would be that they give this matter special attention. I would tell them to remove the best varieties they can find from their wild habitats to their gardens and orchards. These will be hardy enough to endure the winters, which is a fatal point in connection with the cultivation of fruits in the Northwest. Cultivation may increase the size of the wild fruits, also their other characteristics, and cross-fertilization with some of the choicest varieties now in cultivation may produce new varieties of still more valuable qualities, especially in the way of hardiness of plant and excellence of fruit. I think it is through some such means that advancement in practical pomology is to be brought about, rather than through the introduction of varieties from northern Europe. No country in the temperate zone is so rich in wild fruits as our own ; and certainly we would be short-sighted and negligent of our

duty if we did not develop them by using the most intelligent and pains-taking care.

Two years ago I had Mr. T. T. Lyon, of Michigan, commissioned to visit the Northwest and look up the condition of Russian and other fruits, and a special report embodying the information which he obtained was published; a copy of the same has been sent to each member of your society, but if there are others who would like to have it, I will be glad to supply them with copies.

In regard to future work it is my purpose to not only make a personal trip of investigation during the next summer through the Northwest, but if means are placed at my command, I will take steps to have special agents appointed to carefully look up matters of a pomological nature there, and assist and co-operate with your society in this matter. Any suggestions or indications of the feelings of your members upon this subject will be highly appreciated, and, if possible, carried out.

Yours respectfully,

H. E. VANDEMAN, Pomologist.

I think there is one line of investigation that would help us in deciding the possibilities of growing apples successfully in many localities, which would be the procuring of information where the native crab apple (*Pyrus coronaria*) grows in the thickets and upon what kinds of soils, high or low altitude, aspect, sloping in what direction, and where located in the state. This suggestion comes from a prominent horticulturist, who thinks the shortest, easiest and best scheme for successful apple culture in the Northwest will come through the hybridizing of our native sorts, and the best, largest and longest keeping Russian varieties with the native crab (*Pyrus coronaria*.)

The following are his reasons for his faith:

1st. For ages past nature has been fitting our wild crab apple to endure all vicissitudes of our cold vigorous climate.

2nd. It has the thick leaf to help bring it through protracted drouths.

3d. Its thick, rough bark will guard it against "scald" or being affected by heat or cold.

4th. Unlike all other species through which we have been trying to obtain the "coming winter apple" all of its numerous varieties are "strictly winter."

I. D. Brown, author of "*Sylva Americana*," describes this crab as *Pyrus malus coronaria*. The Garland Flowering Apple tree or American sweet scented crab. *Pyrus coronaria* of De Candolle, DeTorrey, and Gray, and Laudon. *Malus coronaria* of Michaux; Pommier Sauvage of the French; and Amerikanischer Holzappelbaum of the German.

This variety is native from Canada to Louisiana. It is found in fertile soils in cool moist places, near the borders of woods, where it usually grows to a height of fifteen to eighteen feet with a trunk six or seven feet in diameter. The leaves are broadly ovate, rounded at the base, sub-angular, smooth on the upper surface, and when fully developed are distinctly toothed.

The flowers are white at first and gradually change to a purplish hue before they fall. They are large and occur in corymbs, with smooth peduncles, and during the blooming season, they perfume the whole air with the scent of violets. The fruit is flatly orbiculate from an inch to an inch and a half in diameter, of a yellowish green when ripe, which occurs in September, and gradually becomes more yellow and somewhat translucent with age. It is of a firm texture, extremely acid, and has sometimes been employed in the manufacture of cider and preserves.

Successful experiments have been made in uniting this tree by grafting and budding, with the common apple; but the time is so long for bringing it to perfection that no particular advantage can be derived from such a union. It has been suggested, however, that new and valuable varieties might be obtained from seeds produced by fertilizing the flowers with the pollen of the vigorous growing pippins, or those of the Siberian crabs.

Setting aside all other considerations, this tree from the beautiful character of its leaves, the fragrance of its blossoms, together with the lateness of their appearance, and the deep green and depressed form of its fruit, it is a most desirable object of culture and no shrubbery should be without it.

MISCELLANEOUS ITEMS.

Our secretary should open correspondence with all the State Horticultural Societies in the several Northwestern States, with a view, if possible, of arranging dates for annual meetings, so that no two will come in the same week.

A new use for annual and life membership fees is presented to your notice for creating a fund to offer as premiums for the encouragement of special work with particular objects in view, such as bringing to notice some new native fruit, or hybridizing the native crab, with some long keeping pyrus malus variety of the apple, and many other things that would be of incalculable value to the interests of horticulture.

Provision should be made for sending delegates from our society to other kindred societies, that they may bring back and impart valuable information to us and them.

I notice one good feature in the Wisconsin report of 1888, and it impresses me as being very practical. I refer to the placing of the recommended lists of fruit trees, shrubs and plants on the first pages of their report where they will attract notice at once, and worthy of adoption by this society.

Another matter of considerable importance to all horticulturists is the necessity of obtaining lower freight and express rates on all their products; and there should be a committee formed for that purpose to confer with those of kindred organizations to bring about the desired result, if possible, for lower freight and express rates means increased profits to all who send their produce to market by this method.

Mr. Wilcox. Mr. Chairman, I move that a vote of thanks be extended to President Elliot for his able and instructive address, and that a committee be appointed by the chair to consider the same and report thereon. The chair then appointed the following committee : E. H. S. Dartt, J. S. Harris, S. H. Wilcox.

A recitation was then rendered by Prof. Harter.

The report of Secretary Hillman was then presented.

SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members:

I have the honor to present herewith my fifth annual report. This is indeed a pleasing task, but it is necessarily prepared with haste, owing to a pressure of duties of a private nature, and in consequence of illness in the family. My time has been so much occupied, in fact, that I have deemed it advisable to relinquish the position of secretary, and to ask that some one be selected to fill this responsible place who has more time at his disposal to devote to the discharge of its many duties.

I desire briefly to call attention, at this time more especially, to matters of interest in connection with my official relation to the society, as well as to the cause of horticulture in general.

I scarcely need remind you, perhaps, that during the period of time I have occupied the position of secretary, it has been my constant aim and purpose to discharge the duties devolving upon me in such a manner as to promote the highest interests of the Society, and thus to aid in the advancement of horticultural interests in this the North Star State. How well I may have succeeded in this laudible undertaking, I leave to others to determine. It has at least afforded constant pleasure on our part to note each year the evidences of increasing interest being shown on horticultural lines of work ; to find the plans of the society being carried out ; to feel that the cause of horticulture in general was measurably being raised to occupy a higher and broader plane ; that firmer foundations were being laid, indicating substantial advancement in each department of the work we seek to foster and encourage.

It has been our desire while occupying this position to make our publications year by year still more and more valuable and attractive, as well as more deserving of the good esteem of all ; to make the fact apparent to the world at large, that we, as a society, are making sure and steady progress in Horticultural knowledge.

RETROSPECTIVE.

During a period of something over twenty-three years, since its first organization, our Society has pursued its onward way. And in glancing at its present status, we find the interest of our members for the promotion of the work on hand is unremitting; that one and all are ready to accord their cheerful, hearty co-operation on every line that gives assurance of success. It may be true that partial failures and various hindrances have dimmed the ardor of many individuals here and there, as well as sorely tried the faith of all at times; but, notwithstanding these discouragements in the past, there is today a spirit of determination manifest which well portends the coming of a brighter day; and hence we feel assured of ultimate success in growing fruit.

The officers of the Society have faithfully performed their part and labored earnestly to promote a love for horticulture among the members, as well as in the state at large. We find that year by year our meetings steadily increase in point of interest and in the number in attendance, and thus a spirit is awakened worthy of emulation if not enthusiasm for the cause. Our worthy President has labored ceaselessly for the advancement of horticultural work. A man of indomitable energy, push and zeal, with unflinching courage and steady trust, he has manfully stood at his post of duty, often giving liberally both of time and money as well as earnest thought to the promotion of our work. How well he has performed his duty, the future will alone reveal. We owe to him a debt of gratitude which we can only pay by still insisting that he continue, as in the past, to hold the helm and bravely guide our goodly ship in safety to the haven of success.

OUR REPORTS.

A casual glance at the reports of our society will show that in the contemplation of horticultural topics we have been earnest students. The questions taken up and treated year by year have been of quite a varied nature and cover a wide range. But there is need of this; and while we find to some extent a similarity in some of our reports, yet in the various discussions had from time to time new facts are constantly elicited and new experiences of value given. This surely indicates a steady progress, and in the right direction. While the advancement has seemed slow at times, yet it has been continuous and gratifying. Our membership, though not as large as could be wished, is well maintained and rather on the increase.

FAILURES.

There is a doubtful feeling in the mind of some with regard to growing apples and larger fruits in Minnesota, but this is not the only place where trees have died, where blight and mildew show their ill effects, or where destructive insects carry on their devastating ravages. Horticulturists of sister states have entered many loud protests concerning failures and disappointments everywhere,

and we are glad to see that they are happily emulating our example and saying they shall persevere and try again.

President Johnson, of the Kansas State Society, cites the fact that one man in that state to whom he sold three hundred trees some eighteen years ago, has now but four or five varieties left, but said the man assured him he would plant another orchard and make a further effort at raising fruit.

In Illinois the state society was so impressed with its importance they sent their president and secretary on a trip through the northwestern states in search of hardier and better varieties. Those wide-awake and keen observers, during the past summer, paid a visit to Minnesota in order to discover, if possible, some means of repairing the disastrous failures there experienced.

Our sister states of Wisconsin and Iowa can also show a chapter of appalling failures; but there, again, among the fruit men we find a feeling dominant to "cut and try again."

VOLUME SEVENTEEN.

Permit me here to call attention briefly to our last report, the seventeenth volume of this society's transactions. It is perhaps the largest, and in some respects the most valuable of the series published, reflecting credit alike on the society and on the printers and publishers, the Pioneer Press Company. The typographical execution of the work is almost faultless, and being printed on tinted paper (which was without additional expense to the society), it adds materially to its appearance. When properly bound it makes a volume well worthy to be found in any of our public libraries and is eagerly sought for such purposes. In spite of condensation and the omission of several interesting papers, the book contains about 480 pages, and with its illustrations is fully up in size to the established legal limit. In this connection it seems important to call attention to the necessity of brevity of statement in these reports. We should preserve the "kernel," but throw aside the chaff.

ILLUSTRATIONS.

A new feature was introduced in this report, for the purpose of preserving the portraits of the presidents of our society. With this object in view the photograph of Col. D. A. Robertson was obtained, after much solicitation, for a frontispiece. He afterwards came forward and gave our library fund a generous donation. This picture is a very good one of that sturdy pioneer, who did such grand foundation work in other days, who lingers yet among us, and still is hopeful for a bright if not a brilliant future in the development of Minnesota horticulture.

The illustrations of Prof. Lugger's interesting scientific lecture on flesh-consuming plants, are neatly executed and pleasing. Such articles as these add greatly to the value of our publication and give us character abroad. The manuscript was carefully prepared, and the expense of cuts to the society was, by his assistance, much reduced. The cost of illustrations having been reduced so

much of late, they should be used, perhaps, more freely in the future than heretofore.

Ry reference to the last report, it will be seen that more than twenty leading topics were discussed at our last annual meeting. There were also numerous reports and quite a large number of papers read; among the latter, several prize essays, as well as interesting and valuable contributions from our lady friends. The Rose, Chrysanthemum and other flowers, were given prominence in the discussions. The cultivation of flowers has been too much neglected heretofore, and hence more space was given to this department on the program for our present session. The floral realm with its profusion of delicate, sweet-scented flowers, ought, so to speak, to be "invaded," and we should urge more earnestly the propagation of flowers to beautify and lend attraction to the home.

We call attention to our Station and District Fruit reports. Though not as full, perhaps, as could be wished, they furnish information concerning progress made within the year. These brief but comprehensive histories of Minnesota horticultural work, ought not to be neglected. They should be faithfully reported and given an accurate outline of our work.

The last report was issued somewhat earlier than usual, although the printers were delayed by other publications. The work of printing was finished in the month of May. There being no provision made for binding the report in cloth, as the authorities construe the law, the secretary of state considered it a stretch of his official prerogative to grant an order for that purpose. However, he consented to have three hundred copies bound. Five hundred copies more were bound at the expense of the society. This number is not large enough to meet our wants. The law should be amended and provide for at least two thousand copies to be bound in cloth. As is well understood, our present edition is limited to thirty-five hundred copies.

THE FRUIT CROP.

The past year was not a favorable one for growing fruit, the small fruit crop especially being very light. Drouth and early frosts were the principal causes conducing to this result. Strawberries have seldom been a lighter yield. And partly in consequence of this fact no summer meeting was held by the society. The quality of the fruit produced was generally reported good. The yield of apples was quite encouraging, as many orchards bore a heavy crop. The season was too short to ripen all varieties of grapes, but there was full an average yield reported, from different sections of the state.

THE FUTURE APPLE.

In this connection, we wish to call to mind some of the causes of failure in general in growing fruit. The apple is, or ought to be at least, our staple fruit. Why should it not be made to pay a liberal return to every farmer in the state? And why should we be satisfied with simply growing Duchess, crabs and hybrids? Some

choice varieties of fall and winter apples should be propagated before the industry may properly be said to be successful. It is indeed a difficult undertaking to find a sort that fully meets all the required conditions, as, for example, hardiness, productiveness, size, beauty, quality and form, with long-keeping merits to commend it to public favor; but such a tree we are determined to produce. By means of continuous experiments and careful tests with seedling apples, and with grafted known varieties we hope to find the looked-for tree. It may not come from Russia, still, if it chance to be of foreign blood it should not therefore be despised. We must select the best that can be found, and when the apple wanted is secured, then let its merits be heralded abroad, and give the public all the benefit of the discovery.

CAUSES OF FAILURE.

We do not think the cause for failure in fruit production in Minnesota lies so much in want of knowledge, or in lack of horticultural education among the masses, as in lack of care. Mismanagement of orchards, neglecting them, and failure to bestow attention on their needs, doubtless are the chief obstacles to growing fruit. Our cattle, horses, sheep and swine need some attention; why not the apple, plum or pear? We leave our trees to struggle for a bare existence, as best they may; the mice and rabbits have free access to the trees; we turn the cattle in to browse upon and break the branches down; we leave the orchard oftentimes exposed to ravages of hordes of insect pests; and then, perchance, we starve our trees to death, and after all this grand array of enemies and drawbacks, we wonder why they yield no paying crops of fruit. With soil of unsurpassed fertility we ought to make a better showing.

We have much to contend with, it is true. Winters are sometimes long and trying; our orchards must endure extremes of temperature and often marked and sudden changes. Fungus diseases, blight and insects must be met and overcome. Neglect in keeping up fertility of soil is one chief cause of failures. Trees need to make a healthy, strong and vigorous growth. Of course these difficulties readily occur to every keen observer. And when we understand all the required conditions we shall be better able to surmount the obstacles.

STATISTICS.

According to a statement published in the New York Tribune, the following is given as the yield of fruit last year in the several states named: New York, 31 per cent of the average crop; Pennsylvania, 37 per cent.; New Jersey, 27 per cent.; Ohio, 47 per cent.; Vermont, 46 per cent.; Massachusetts, 51 per cent.; Maine, 68 per cent.; Connecticut 58 per cent.; New Hampshire, 63 per cent.; Rhode Island, 70 per cent.; Michigan 85 per cent.

In the States of New York, Michigan and Ohio, five million pounds of evaporated apples were made.

In Western New York the industry of grape-growing has rapidly increased of late. It is stated that ten million cuttings have

been set in a single county, forty thousand cuttings to the acre, of such varieties as Concord, Worden, Moore's Early and Niagara. The statement is made that fruit prices were fifty per cent better in places than in 1888, and yet grapes were marketed at three cents a pound. Strawberries were also largely grown and in some cases special trains are used to transport the crop.

According to the San Francisco Bulletin, during the months of September and October, 1888, over eight million pounds of the new crop of California raisins were shipped overland from that state. The same authority gives the shipments of fruit from that state in 1887 as follows: Canned goods, 45,120,900 lbs.; dried fruit, 13,577,000 lbs.; ripe fruit, 49,729,800 lbs.; raisins, 5,759,200 lbs. Other statistics at hand show the fruit industry in California to be rapidly developing, although the profits are correspondingly decreasing. Insects are said to be destructive and constant vigilance is required to overcome them.

INSECTICIDES.

There has been much progress made within a recent period towards the subjugation of insects that prey upon our fruit trees, and although the various agents employed elsewhere for this purpose have not, to any great extent, been tried in Minnesota, it is high time we took decisive steps to gain the necessary information as to the proper means and methods to be used.

Dr. Lintner, state entomologist of New York, asserts that there is now little doubt that by the use of arsenical poisons injurious insects can readily be conquered and subdued.

Prof. L. H. Bailey, of Cornell University, says that the spraying of fruit trees, with arsenical poisons, for the destruction of curculio and codling moth has been a notable success.

Prof. A. J. Cook, of Michigan Agricultural College, recommends one pound of London purple in two hundred gallons of water, to destroy codling moth, curculio, leaf-rollers, tent-caterpillar, and canker worms. He says use kerosene and soap to destroy aphides or plant lice. Pyrethrum is used for the cabbage caterpillar, pear slug, etc., while hellebore kills the currant slug.

Prof. C. M. Weed, of the Ohio experiment station, has made extensive experiments in the use of insecticides and with very marked results. He has also successfully applied fungicides in combating the dreadful blight and potato rot. He is of the opinion, judging from his experiments, that probably three-fourths of the plums, pears and cherries, liable to injury by the plum curculio, may be saved by spraying with London purple, applied two or three times, soon after the blossoms fall.

IMPORTANCE OF ENTOMOLOGY.

Prof. F. H. Snow, of the Kansas State University, says: "I would suggest that if our people were more generally familiar with the subject of entomology, and were able to distinguish between the beneficial and injurious species of insects, our universal enemies would be more intelligently and effectually resisted." He

recommends the introduction into the common school the elements of this extremely practical science.

It is well known that insects often occasion an incalculable amount of injury to our growing crops, as for example, chinch-bugs have destroyed millions of dollars worth of grain in a single season, and at times become almost omnivorous. It would surely seem important to give more attention than has been done heretofore to the study of the characteristics of injurious insects, and how to overcome them. The last report of the Kansas Horticultural Society contains more than 75 pages upon this subject, with numerous illustrations and descriptions of insects, especially those destructive to fruit and forest trees.

Following is a list of some of the more common insects mentioned as injurious to the interests of horticulture in that state, and which may be held in check, if not entirely eradicated, by the use of insecticides, etc.

Attacking foliage: Strawberry leaf-roller. Found on strawberry and raspberry plants. Fall web-worm; on fruit and forest trees, in August and September. Rascal leaf-crumpler; on apple trees. Handmaid moth; on apple, pear, plum and quince trees. Bag-worm; on most classes of fruit and forest trees, and evergreens. Canker worm; on apple trees. Apple flea-beetle; on young apple trees.

Attacking fruit: Codling moth; on apples. Grape-berry moth; on grapes. Apple curculio; on apples and pears. Tree cricket; on apples, pears, peaches and quinces. Tarnish plant-bug; on blossom buds of apple, pear and plum and newly formed fruit of the raspberry. Plum curculio; on plums, peaches, apricots and cherries.

We are fortunate in having secured the services of Prof. Luggar as state entomologist. He is thoroughly at home among the "bugs," and conversant with their habits and characteristics. Prof. Oestlund has also been making careful investigations with regard to some of the insects most common in this state and has given us much interesting information concerning them.

FRUIT MANUAL.

The Kansas Horticultural Society has made a new departure by publishing a fruit manual, giving in a concise and practical form, instructions as to the best and most approved methods for growing fruit. It is brief yet comprehensive, and has been well named "Kansas Horticulture in a Nut Shell." Secretary Brackett suggests that if other state societies would adopt the plan it would relieve the public from the "uncertainty of individual opinions and recommendations." As he has held that position for upwards of twenty years his statements are entitled to consideration. But of course no amount of instruction in theory amounts to anything so far as practical results are concerned, unless the proper care and intelligent thought are brought into requisition.

EXPERIMENT STATIONS.

Since the passage of the Hatch bill, or within the past two or

three years, as is well understood, something like three hundred persons have been called directly to the field of practical and experimental agricultural and horticultural work. Experiment stations are provided for in all the states. These stations are designed, of course, to supplement and greatly to enlarge upon, the plans and methods heretofore employed, not only by this society, but of similar organizations as our own in this and other states. It is a gratifying fact to note in this connection that recently and near the close of the first century of our national existence, a department of agriculture has been established. It seems almost beyond belief that this important industry, which forms the basis of our national wealth, prosperity and greatness, should be so long neglected; and there can be no doubt that with the dawn of this new era we shall see a wondrous progress in the immediate future in all that pertains to agricultural and horticultural knowledge. We hope to see the work commenced by the two thousand agricultural and horticultural societies of the land greatly aided by this experimental work. We must, however, as a society, neither fold our arms nor think our work has been accomplished; and we should not content ourselves by thinking we shall find no work to do. We rather should improve upon the new advantages and opportunities which are being thus afforded us from time to time.

Our central station now is well equipped with land, trees, plants and implements, and also with competent and worthy men in charge. The study of horticulture at the station forms a leading feature, and this department is in the hands of one well fitted to carry forward all its interests, and one who is in thorough sympathy with our society. We ought to heartily co-operate in every way and give the management our earnest, loyal aid.

GEOLOGY AND HORTICULTURE.

It seems to us that every horticulturist of the state ought to understand some of the principles of geology. A careful investigation of the various strata, the physical characteristics of the soil, drainage, elevation, etc., is of importance, and too frequently overlooked by the fruit grower.

Geology is not an occult science. It is founded on such simple things as the running of brooks, blowing of winds, rippling of waves, shining of the sun, cooling of heated matter, growth of vegetation and death of animals on land and in the sea.

The causes which determine the location of the great continental watershed, are those which mark the existence of the Laurentian and Lake Superior ranges of igneous and metamorphic rocks. The area of these rocks in Minnesota includes the sources of some of the great river systems of the Northwest, as well as of the continent of North America. From this area, within the State of Minnesota, since pre-Silurian times, streams have run in all directions toward the ocean. We have the St. Lawrence system of drainage which reaches the Atlantic Ocean to the East; that of the Mississippi, entering the Gulf of Mexico, to the South; and that of the Red River of the North, which, taking an opposite course, finds the

ocean level at the north, through Hudson's Bay, in British America.

While, in general, these rocks form the principal watershed, in some parts of the state the later sedimentary rocks rise much higher and give origin to numerous streams which reach the main valleys at a considerable distance from the granitic areas. Freeborn, Faribault, Martin and Cottonwood counties are probably the most elevated in the state, the altitude reaching nearly 1,600 feet above the ocean.

Enough has been said to show the importance of a knowledge of elevations above the common level at all ascertained points throughout the state. The waters of Lake Superior, for example, are 602 feet above the level of the ocean. Minneapolis is 232 feet above Lake Superior. Half a mile below St. Anthony Falls the level is 118 feet above; at Morehead, 304 feet; at Detroit, 806 feet; Bingham Lake, 811 feet; Worthington is 980 feet above Lake Superior, or nearly 1,600 feet above the level of the ocean.

The surface varies to a great extent in different localities throughout the state, as, for example, in Houston county, in the southeastern corner of the state, the surface is generally undulating, to rough and hilly. The surface of the rock is gorged by numerous canons, and there are deep, wide valleys, and long ridges. The bluffs that enclose the valleys are sometimes tillable. Some of the valleys are over 500 feet deep; for instance, Root river valley, which is in the St. Croix sandstone region, is over 500 feet in depth, with limestone capping the bluffs. At Houston, the bluffs are 520 feet above the water of Root river, at its ordinary stage. Mt. Tom, at Hokah, rises 530 feet above the flood plain of Root river. In that county there are no lakes, and the streams usually run several hundred feet below the general upland level. The loess loam is very thick in this part of the state and is almost impervious to water. Here the Trenton formation is prominent in the southwestern part of the county.

The general surface in Hennepin county is very different from that of the county just mentioned. Here the Trenton formation predominates; and we have also the St. Peter and lower Magne-sian formations. We have an undulating, rolling drift surface, with a nearly level general contour. Numerous lakes abound in the western part. The soil differs widely from that found in southern Minnesota. Very marked differences are to be found in the various counties of the state as regards soil, climate, timber, stone, etc.

This state in temperature is said to rank with that of New England, New York, Michigan and Wisconsin, comparing favorably with western Ohio, Indiana, Illinois and Iowa. The northern or timbered portion of the state enjoys a more equable climate than the prairie districts.

The numerous lakes distributed throughout the state acquire a high temperature during summer, tending to retain the heat until late in autumn, and thus to check injury from frosts.

Lake Superior has an area of 41,800 square miles, and this state

borders on 150 miles of its coast. The mean depth of the lake is 800 feet.

Apples were raised in Minnesota in the first decade of her political existence. More than this cannot be said of some of the older northern states. It is said to be a general rule that where the wild plum, white thorn, and wild rose flourish naturally the apple may be successfully cultivated.

Geographically and physically Minnesota pre-eminently commands a position second to no interior state. Within our borders we have commercial command of outlets to competing Atlantic markets, an ample surplus of food to sustain a manufacturing population, an abundance of natural power, and we have large quantities of wood, stone, iron and copper, which may be converted into useful articles. A geological map of the state shows at a glance the various formations embraced within our territory, and brings out prominently the physical characteristics of the different sections. It should be carefully studied by the fruit grower.

IN CONCLUSION.

I will not trespass further on your time; already I have gone beyond the bounds of what I had intended. Some things to which perhaps I should direct attention will readily occur to mind. But personal suggestions, or advice upon my part, would be almost gratuitous, as well as out of place, with those who are so thoroughly fitted by practical experience to give instruction in horticultural affairs.

Congratulating the Society upon its past achievements and wishing all its officers and members prosperity, thanking one and all sincerely for kind co-operation and sympathy in our work as secretary, I bid you for the days to come a very hearty God speed.

FINANCIAL REPORT OF SECRETARY.

Following is a statement of receipts and disbursements by the secretary for the year ending January 20, 1890, as shown by itemized statement submitted:

RECEIPTS.

Membership fees.....	\$75.00
Amount to balance.....	6.73
Total	\$81.73

DISBURSEMENTS.

Miscellaneous expenses.....	\$ 1.50
Postage stamps and cards.....	17.00
Expressage and wrapping.....	17.98
Printing.....	20.25
Cash paid treasurer.....	25.00
Total	\$81.75

Respectfully submitted,

S. D. HILLMAN,
Secretary.

The report of the treasurer was then read by Mr. Day, and was referred to the auditing committee.

TREASURER'S REPORT, FOR THE YEAR ENDING JANUARY 20, 1890.

Jan. 18.	Balance on hand at commencement of year.....	\$219.89
" "	Membership fees.....	3.00
Jan. 20.	Received from state treasurer.....	500.00
	Received from S. D. Hillman, membership fees.....	25.00
	Received from Col. D. A. Robertson.....	25.00
	Membership fees.....	2.00
June.	Received from state treasurer.....	500.00
	Received from Sidney Corp, life member.....	10.00
Amount received.....		\$1,284.39

DISBURSEMENTS.

Jan. 16.	A. W. Sias, delegate to Iowa.....	\$ 6.40
" 17.	E. A. Cuzner, year's salary and help after fire.....	12.20
" 18.	V. H. Campbell, R. R. fare and bills.....	17.90
" "	Wyman Elliot, trimming hall.....	6.00
" "	A. W. Sias, vice-president, R. R. fare.....	3.73
" "	S. D. Hillman, 4th qrs. salary.....	125.00
" "	J. M. Underwood, expenses.....	2.50
" "	E. H. S. Dartt, expenses.....	2.68
" "	G. W. Fuller, vice-president.....	3.00
" "	J. S. Harris, expenses, &c.....	25.10
" "	O. F. Brand, expenses, &c.....	6.70
" "	M. Cutler, vice-president.....	2.25
" "	Frank Shepherd, prize essay on blackberries and dewberries,	25.00
" "	Ditus Day, ex-com. (express).....	2.00
" "	John Lyons, prize essay on raspberries.....	25.00
" "	Norton F. Brand, prize essay on currants and gooseberries,	25.00
" "	Archie M. Brand, 1/2 prize essay on orchard.....	12.50
" "	Edgar D. Sias, 1/2 prize essay on orchard.....	12.50
" "	Archie Wilcox, prize essay on grapes.....	25.00

PRIZES AWARDED AT WINTER MEETING, 1889.

Jan. 18.	Sidney Corp.....	\$ 5.00
" "	F. G. Gould.....	15.00
" "	A. W. Latham.....	3.00
" "	C. G. Patten.....	1.00
" "	Wm. Lyons.....	21.00
" "	Mrs. Wm. Lee.....	1.00
" "	Mendenhall, display green house plants.....	23.00
" "	H. F. Busse.....	11.50
" "	J. Allen.....	5.00
" "	J. S. Gray.....	1.00
" "	Wm. Urie.....	2.50
" "	Wm. Danforth.....	2.00
" "	L. H. Wilcox.....	3.00
" "	Mrs. E. B. Webster.....	3.00
" "	J. C. Kramer.....	1.00

Carried Forward \$340.46

	Bro't Forward.....	\$ 340.46
	Amount of premiums at winter meeting.....	\$ 98.00
Feb. 27.	C. L. Smith, delegate to Wisconsin.....	\$ 15.10
Mar. 6.	S. D. Hillman, entertainment at York State house.....	13.25
" "	Harlow Gale, hall rent.....	20.00
" "	Prof. Otto Lugger, cuts for report.....	50.00
" "	L. H. Wilcox, expenses at com. meeting.....	5.70
" "	O. F. Brand, " " ".....	3.64
" "	J. S. Harris, " " ".....	6.35
" "	J. M. Underwood, " " ".....	5.50
" "	A. W. Latham, " " ".....	2.58
" 15.	S. D. Hillman, 1st qrs. salary.....	125.00
" 21.	S. D. Hillman, lithograph cut of D. A. Robertson, 1st president of Minnesota Horticultural Society.....	12.00
June 15.	Frank Engel, binding in cloth 500 reports and wrapping...	103.00
July 25.	S. D. Hillman, postage on reports.....	120.00
" "	S. D. Hillman, 2d qrs. salary.....	125.00
	G. W. Fuller, expenses on seedling com.....	28.91
Sept. 12.	A. W. Sias, " " ".....	33.00
Oct.	J. S. Harris, expenses, &c.....	5.00
Oct.	S. D. Hillman, 3d qrs. salary.....	125.00
	Wyman Elliot, salary.....	25.00
Jan. 1890.	S. D. Hillman, 4th qrs. salary.....	125.00
	Treasurer's salary.....	25.00

Whole amount paid out.....\$1,413.03

Amount received.....1,284.39

Balance due treasurer.....\$ 128.64

Respectfully submitted,

DITUS DAY,

Treasurer.

LIBRARIAN'S REPORT.

My report, as librarian, is not what I would like it to be, having been obliged to move things out of our old quarters in the agricultural building in a great hurry, and our temporary quarters are at the Colosseum, and are such that it is almost impossible to say just what there is on hand. I do know that we have sent out some twenty-one or twenty-two packages of reports, as advised by our secretary, and that our exchanges are in keeping of our president, Wyman Elliot. I have been trying for some better quarters all summer without success; but last week I spoke with ex-governor J. S. Pillsbury, and he said that he could get a room in the new Seabury building which will be fire-proof. Meanwhile, we can use a room in the Science building to keep such as are needed for supplies, so that there need be nothing in the Colosseum but what is boxed up.

E. A. CUZNER.

An adjournment was then taken till Wednesday morning at o'clock.

MORNING SESSION.

WEDNESDAY, JANUARY 22, 1890.

The meeting was called to order at 9 o'clock, by President Elliot.

The president announced the following committees:

Fruit Lists—J. S. Harris; L. H. Wilcox; George Lowell.

Awards of Premiums—E. H. S. Dartt; Andrew Peterson; Edson Gaylord.

Publication—Prof. B. Green; Col. J. H. Stevens; J. T. Grimes.

Final Resolutions—J. T. Grimes; Dr. M. M. Frisselle; Mr. Burnett.

Obituary—S. D. Hillman; Col. J. H. Stevens; J. S. Harris.

The financial report of the secretary and the report of the treasurer were referred to the executive committee.

The following paper from Mr. Wilcox was then read by the secretary:

RAISING SEEDLINGS.

By E. Wilcox, of La Crosse,

Members of the Minnesota Horticultural Society:

Your secretary's urgent request for an article from me, giving my experience on apple tree growing, is received, and I do not feel quite at liberty to refuse, although I have long since ceased to have any ambition to see my name in print, or to take pride in stirring up my co-workers to pitch in and criticise me.

In one of your reports I find the question asked: "Has any one ever known the roots of apple trees to be killed by freezing?" Mr. Fuller. "Yes." Mr. Pearce. "I think not." The society took a recess, and that ended, so far as I know, or have seen, all further answers to the question.

The winter of 1872-3 killed about 60,000 trees in our nursery at Trempealeau, Wis., and about 1,000 in our orchard by root-killing. When I learned the condition of the nursery and orchard, I wrote to a friend of great experience in Wisconsin, stating the above facts. He replied: "Of course there is no help for the nursery, but the orchard can be saved by thinning out the branches and heading back those that are left." I gave a neighbor who had a bigger orchard than mine, this information, and we both went to work for a number of weeks, following instructions; no use. The orchard was past redemption. Even Transcendent crabs were root-killed.

The winter of 1874-5 was so destructive at South Haven, Mich., that the Pomological Society at that place, appointed a committee of A. T. Linderman, A. S. Dyckman, J. S. Linderman. This committee sent out circulars with eleven questions. These were

answered by individuals from Geneva, N. Y., to Wassau, Ill., all admitting destruction by root-killing. Now, this is not from memory; I have it in my scrap book. I do not think it necessary to write out the questions or answers. I will, however, give extracts from a few:

P. Barry, Rochester, N. Y. "Instances are rare of trouble of this kind. One winter, some twenty years ago, and last winter the only instances in thirty-five years. In both instances the winters were not remarkable for their low temperature but for their long continuance; much wind and little snow. The injuries were all sustained on elevated spots, where the wind blew off the snow and left the ground exposed to frost."

From D. R. Waters, Spring Lake, Mich. "I am of the opinion that trees on dry soil suffered most. Trees were not generally favored with a covering of snow. All root-killed trees leaved out again and some of them, especially on ridges, blossomed, when the same variety of uninjured were blossomless the same season; but the injured trees soon withered."

In conclusion, I will call your attention to an experience in planting an orchard that my friend, Thos. Petty, Esq., had in purchasing trees for an orchard four years ago. He was imposed upon, inasmuch as he received and planted as a valuable variety of the peach, fifty almond trees. During the four years these trees have stood in the ground, he has found but two borers, although they have been hunted twice a year in common with his other trees; and although the peach trees all around those fifty trees have been root-killed, not one of these almond trees have suffered. As a remedy against root-killing, and also borers, does not this experience suggest to nurserymen that it might be valuable to put the peach on the almond stock, and would this not also be another guard against the "Yellows?" Now, this writer has gone back to the origin of the peach, and given some valuable suggestions. I propose to go back to the origin of the apple and follow with my experience in propagating it.

From Downing, transplanted into a warmer aspect, stimulated by a richer soil, reared from selected seeds, carefully pruned, sheltered and watched, by slow degrees the sour and bitter crab expands into a golden pippen; the wild pear loses its thorns and becomes a Bergamott or a Beurre; the almond is deprived of its bitterness and the dry and flavorless peach is at length a tempting and delicious fruit. Now, in producing such great changes in these fruits, is it not reasonable to suppose the trees have been weakened and their vitality destroyed?

After the destruction of our orchard and nursery in 1872-3. which was grown in the usual way, by grafting on the common apple root, and seeing how well crab seedlings survived on their own roots, we adopted the following plan: Plant crab seeds and then graft the Transcendent crab in the roots of the crab seedlings, and when these trees were three years old, bud the kind of standard apple we wished to grow, into the limbs of Transcendents. We made this plan public and met with a good deal of ridicule from nurserymen generally. That old veteran, Charles Hamilton,

of Ripon, wrote me, saying: "Your hobby will row you up Salt River. Trees propagated in the way you propose will be worth at least one dollar each by the hundred in the nursery." Well, although we offered these trees for 50 cents each, yet the prejudice was so strong against us that we could not sell them, and I have been exploring the head waters of Salt River ever since, and have found no safe financial anchorage yet, while the tree peddler has found fresher waters and greener pastures with greener victims.

Now, we were partly right about the matter. Our "hobby" experience has shown that some varieties are failures when worked on Transcendents, and Mr. Kellogg's plan is unsafe to follow in full. The Duchess, Red Astrachan, Tetofsky, Utter's Red and Willow Twig, are failures when budded on Transcendent. Plumb's Cider, Hall's Pewaukee, Wealthy are a tolerable success; and McMahon White, and a number of seedlings are entirely so. Will send you some of these seedlings for your winter meeting. Many of the trees in our orchard are top worked on Transcendents.

Now, if I were a young man, with the experience we have had, I would plant the seeds of the hardiest kinds we know of, mostly crab. When these were old enough—say three years—I would bud into the limbs the kinds I wished to propagate, not using limbs more than one-fourth inch in diameter. For instance, take Famuse, note carefully the tree in which the union is perfect, growth good, etc.; then take scions from this tree, graft into the roots of seedlings above described, and I think success will follow. I would pursue the same course with all others. With me, I would not top work the Duchess, Peach apple, or Tetofski—they stand anyway, and here let me say that orchards can be grown as they used to be, if common sense is used. The first orchards were planted here in new land, well prepared. Now a few trees are occasionally set, obtained, perhaps, from the tree peddler at Rochester, N. Y. They are set in a shiftless manner, where trees have failed, in the sod, and where cattle, horses and hogs are pastured, so that nothing be lost except the fruit trees, then the old story is told—can't raise apples here. I went to our State Fair last fall, and I believe there was nothing on exhibition in the fruit line west of Sauk county, cranberries excepted, except the show made by A. J. Phillips and myself. Years ago I have seen some as fine Northern Spy, Bailey Sweet, St. Lawrence, Utter, Fameuse, and many other kinds, as I ever saw, grown in this section of Minnesota and Wisconsin.

While I would not advise the setting of most of these kinds, we have many kinds which I would advise people to set, and there are hundreds of places, yes, thousands, along the bluffs of the Mississippi river just as good as A. J. Phillip's and mine. We have shown the public we can raise apples. Go thou and do likewise.

DISCUSSION.

Mr. Harris. Mr. President, the author of that paper is one of the old pioneers in fruit culture in the Northwest. Not only is he

an old pioneer, but he is getting to be quite an aged man and has always borne the reputation of being an honest and outspoken man, and this is probably the last paper we will ever get from him. He is now over his four-score years, and is in declining health. It took considerable persuasion to get him to honor us with this paper, and I hope that we will treasure this article which comes from actual experience.

He sets his trees and takes care of them. There are thousands of trees set out in Minnesota which if instead of setting them in the old hole where a tree had died, we would prepare our soil as we did originally, and afterwards set trees and keep them cultivated, we would succeed. I think three-quarters of the trees are lost by those who are trying to keep up their old orchard by setting them in grass and unprepared soil, and afterwards neglecting them.

Mr. Gaylord. I think that is one of the best papers I ever heard read on that tree question.

I won't go over the ground, but I want to speak a word in reference to what our friend, Harris, said about setting new orchards over our old orchards. I claim that you can set a tree in an old orchard and make it grow, and make a success of it, but you can't make a hole in the thick heavy grass and set your tree and not mulch it; if you do, that tree will most surely fail. I want to say this, that when you dig your hole, make it as big as a wagon wheel. When you plow the ground all up thoroughly then you can dig just as small a hole as you have a mind to, and so long as you get the roots straight you are all right. If you dig a little hole and the ground is not mulched, why, the loose dirt in that hole will soon take the moisture right out of it and it will dry up like water out of a basin; but if you dig your hole large and mulch very thoroughly, then it will not dry up.

Mr. Dartt. My opinion agrees pretty well with Mr. Gaylord in regard to digging the ground very well, making it good and mellow, but I would say in addition to that make it rich. The drouth will not affect it so much if the ground is rich, as it will if it is poor. I have had a good deal of experience in manuring orchards—manuring apple trees, and I have yet to see the first bad effects from piling on manure. I have seen one instance where a man piled on a great deal more than I usually did. He had a few trees. He had to dispose of the manure of a stable close by, in which he had a cow, and he spread the manure all around those few trees for a year or so, which made the ground very rich. He then built a hen yard, and took those trees into it, and with all the manure those trees got they have done better than any other trees in that neigh-

borhood. I am inclined to believe that a large proportion of our trees that die in orchards after they have produced one or two crops, die from starvation. A good many of them would live longer than they do if we would pile on manure.

President Elliot. I would like to ask Mr. Somerville what the effect on his orchard is.

Mr. Somerville. On my orchard I haul out as many as forty wagon loads of manure to the acre every year and spread it over the ground. I mulch my trees thoroughly. I think it is an impossibility for a tree to bear fruit and live any length of time, making a thrifty growth, unless the ground is properly manured. If it requires all the vitality there is in a tree to ripen and mature its fruit without making any growth, it will not last long. I have observed that from experience. If we can keep the ground rich enough to make a tree have considerable growth, besides maturing its fruit, then there is a prospect of its living a number of years.

I have trees in my orchard that have now stood there twenty-eight years, and to-day I believe they are just as healthy as they were twenty years ago; at least I sold more than four tons of apples from an orchard of Duchess, seven by nine rods in size, this past season. The trees bear every year; but this result is only accomplished by means of heavy manuring and mulching. I have other trees likewise that I treat in the same manner. I find as they grow older they require more mulching. The vitality in a tree must be kept up. It appears to me that there is a similarity in animal and vegetable life. We must feed a tree because it is very exhausting for it to produce its fruit each and every year. The results from mulching with me have been very satisfactory. It keeps the ground in good condition and does not let the grass grow.

Mr. Barrett. In the West my experience teaches me that plants must be planted deeply. Where I live we have a subsoil of clay underneath a yellow loam. I was querying whether there was not great danger of over-feeding with manure; that is in the locality near Brown's valley, where the soil is from five to six feet deep and extremely rich. The residents in that part of the valley are trying to raise crabtrees and other fruit plants, crabs especially, but they grow too rapidly and are not healthy.

Mr. Somerville. I think it can be overdone before the trees get into bearing.

Mr. Barrett. Mr. President, is it the practice in the West to put old manure down deep in the holes instead of putting it on the surface?

President Elliot. From all the information I can get, and all the reading I have indulged in, from all the reports and everything, the advice is to put no manure at the roots. If you will take a common sense view of this you will see that if you put your manure on top it will reach down. Never put manure on roots of any kind; keep it away entirely, and after you have got your tree planted then you may mulch it. It will go down. Brother Pearce is right when he says nitrogen goes down.

Mr. Gaylord. I have had some little experience in that line. When I go out into my barn and find my calves are not doing well, I know there is something the matter, and so I give them plenty of nice hay. It is the same with an apple tree; if you have an apple tree and it is not making a good growth you should put manure on it. I never put raw manure on the roots of any plant; it is not necessary; but when you find trees in your orchard not making proper growth you want to put manure on them.

Prof. Green. Mr. Gaylord, would you put manure on top of the ground, exposed to the sun?

Mr. Gaylord. Yes sir.

Prof. Green. I wouldn't.

Mr. Gaylord. I would for a sort of mulch.

Prof. Green. You would lose much of the value of your manure by so doing. It wouldn't do to leave well rotted manure on top of the ground.

Mr. Pearce. The true principle, I think, is to apply manure at the surface, will say not to exceed two or three inches. There are properties in manure that will pass away if exposed on the top; that is the ammonia. That is the only thing that will pass off. But the secret is here in raising trees. It is not the quantity that you put on, because it only takes a short time for manure to pass beyond the roots of trees. Roots of plants do not go very deep; they are all near the surface.

Dr. Frisselle. I think my friend, Mr. Pearce, has rather limited ideas as to the ability of the roots of plants to penetrate the earth to find food and nourishment. I think apple trees send their roots pretty deep, and Prof. Green tells us corn goes six feet; and at five and a half feet clover finds nourishment, or else it would not be found there. I want to say a word about planting trees.

A friend of mine living in Maine undertook to plant an orchard and his neighbors told him he ought to plant his trees as they did; but instead of doing so he dug an immense hole into which he put a full load of manure and covered it with earth and planted his

trees. His friends said they would never grow, and ridiculed him, but he succeeded in having the best orchard in that county.

There are two points to be kept in view in keeping an orchard healthy. I think that after a tree has acquired its growth it then needs to be fed sufficiently to keep its vitality up. If it is overfed, there is a tendency to produce a growth of wood instead of fruit. I think there are quite a number of points of this sort that ought to be kept in mind in order to give us proper ideas as how to treat apple and other fruit-producing trees.

President Elliot. There was one question that I asked Mr. Somerville in regard to blight, which he did not answer. I would like to have him state whether through high manuring of his orchard his trees have been affected with blight.

Mr. Somerville. They have been affected but very slightly with blight. My Transcendents blight a little but not enough to do any particular harm. When I find a limb blighted, I cut it off, and the result is, I am not troubled much with it. Those are the only trees in my orchard that blight at all. Nor have I any sun-scalded trees. I don't think you can find one in my orchard.

President Elliot. Your Duchess trees are planted close enough together to afford protection to each other?

Mr. Somerville. Yes, they occupy a space of seven by nine rods. I put the ground in thoroughly good condition in 1862, and then I took my plow and made furrows eight feet apart each way, in the same manner as if I were going to set out corn, and then I commenced and set my trees along the first row sixteen feet apart, and in the next row eight feet, but between the two. In that shape I went over and set out fifty trees in 1862. They are a solid block and cover the ground, almost, in the summer time; their limbs are interwoven. They have borne fruit every year since 1866, and there are 49 of those 50 trees living today, sound and healthy.

President Elliot. They are on a strip of ground seven by nine rods.

Mr. Somerville. Yes, sir. I sold more than four tons of apples off the trees on that strip of ground this past year, and still had some left for our own use.

President Elliot. Now, I want to inquire in regard to the nature of your soil.

Mr. Somerville. My soil is a clay soil with a northern descent. I have the orchard well surrounded with evergreens.

President Elliot. How high are you above the general level of the country?

Mr. Somerville. Very near the general level of our prairie. There are some valleys near by.

President Elliot. The cold air goes into these valleys. Is there any water near?

Mr. Somerville. Yes, sir. There is a spring branch on the north side of my orchard, about ten rods away. I have ten acres enclosed for orchard purposes; that is, I have it surrounded by evergreens, Norway Spruce, mostly. Then I have that cut off into squares; the southwest two and a half acres I use for small fruits and for garden purposes and my buildings, and the other seven and a half acres I have in orchard. My trees have done well, and I have made more off that piece of ground, proportionally, than from any other portion of my farm.

A member. Is this manured annually?

Mr. Somerville. Every year.

A member. What do you keep to get your manure?

Mr. Somerville. Cattle and horses.

A member. How many cattle?

Mr. Somerville. About thirty.

A member. Does it all go on this orchard?

Mr. Somerville. Oh, no; I couldn't put it all on that orchard; that would be too much.

A member. What state do you live in?

Mr. Somerville. State of Minnesota, 12 miles east of Rochester. I suppose I have raised as many apples as any man in the State. In 1860 I went into the orchard business, and in 1862 I set out Talman Sweets, Willow Twigs, Fameuse and a number of other eastern varieties. I have raised perhaps seven hundred bushels of the Talman Sweet, but about three years ago they died out. I intend, however, to set out some more trees in the spring.

Mrs. Kennedy. Are we to understand that the forty loads of manure was spread over seventy acres?

Mr. Somerville. No, I spread that on one acre.

Mr. Gaylord. There is one little point. I know Mr. Somerville has been successful in orcharding. I have a neighbor by the name of John Elliot, and I will tell you what he told me. He said, "Mr. Somerville has got an extraordinary good location; if I understand what is necessary for an orchard, and he takes care of it. He is a man that has sagacity enough to know how to make good his surroundings." I said, "How is it about his altitude?" Mr. Elliot scratched his head a little and said, "Mr. Gaylord, I will tell you what a surveyor told me. He said, 'It is the highest land anywhere in the State of Minnesota.'"

REPORT OF COMMITTEE ON RUSSIAN APPLES.

The report of Committee on Russian Apples not being prepared the separate members of that committee were called upon for a verbal report and the following discussion took place:

Mr. Dartt. While I might say a few words in regard to Russian apples I will confine my remarks mostly to my own experience, what I know and what I have heard about Russian apples.

I commenced the cultivation of Russian apples nearly forty years ago. I got the Tetofsky from Mr. Gould, a gentleman who lives in Wisconsin, under the name of Russian Crab, and it was at that time a wonderful thing. I set them out, and in two or three years, from a tree that was cut off by rabbits, that was not over 18 inches high, I got nine nice apples. At that time it was considered very early bearing in Minnesota. I brought a large stock of them to Minnesota and put them in a nursery and started them, and I have seen in Minnesota five apples growing on a nursery tree. Well, where such things are facts it very quickly creates a boom. I planted them largely. I think they were planted all over the country. I afterwards regarded them about as hardy as the Duchess until four or five years ago. I had them in an orchard just far enough from a southern protection to be most benefited by it, or about three rods. The trees did remarkably well and bore several years and paid; they were remunerative. But of late years, the young trees have not borne as they used to, and the older trees have kept dying out gradually. Although I think the Tetofsky may not be as hardy as some other Russian apples, yet I think it is about as hardy, because most of our hardy trees are those that bear early; but, in my opinion, it is not hardy enough for Minnesota, and unless we have good Russian apples that are hardier, I don't think we ought to expect much profit from planting them in Minnesota.

I have had experience with Russian apples since 1874. I then planted quite a list of them received from the agricultural department at Washington; cultivated them well, got them up four or five years old, and then cut scions from the best ones and grafted some twenty-five varieties. Five or six kinds, of all those trees, have been gradually dwindling out, although some of them bore in orchard a crop or two, and then died out; the whole of them are nearly gone; there are a few left. Therefore, I conclude my experience is not favorable to the Russians.

It has been said that the first importations were not so hardy as more recent ones, but I know in that first importation I got, the

Lieby, which is considered as hardy as any of them, and that has failed; and whether or not the return of milder seasons and better treatment will bring out any Russians that will stand, I don't know; I am still in doubt as to their value. I have not any great faith in getting the apple we are looking for among the Russians.

Mr. Somerville. I am now getting quite old, but if I live ten or twelve years longer I will then be better able to give you my opinion on Russian apples. I have experimented with about 140 varieties now. In 1878 I got some scions through our congressman, Mr. Dunnell. I don't know where he got them, whether at the department at Washington, or from some agent. He sent me a bunch of scions which I grafted and they have done remarkably well. I have raised considerable fruit; I think there is among them no variety that is so prolific an annual bearer as our Duchess, but I have some in the Anis family that I think every alternate year bear as large a quantity as the Duchess. I have about 47 varieties now in bearing of the Russian apples. Among these, I have some that produce excellent fruit. I will name the White Pigeon (I give the name as I understand them). White Pigeon, I think, is rightly named, and Prof. Budd and Mr. Tuttle are of this opinion also. It is a hardy tree in my orchard. It has never shown any blight whatever, and is sound and healthy. I have three or four of those trees. One year they bear a fine crop and the next year the crop is light. The apple is not so large as the Duchess, but is of very fine quality. I have also what I call the Charlamoff.

A member. Is it early or late?

Mr. Somerville. Very early, earlier than the Tetofsky. It is of the Tetofsky family; there is no doubt of that. Then I have of the Anis family, the Red, Yellow, Kursk and Blue Anis. I have some of the Kursk Anis apples at home now; they are a pretty fair apple. Red Anis is early, and the trees I think are hardier than Duchess; I will qualify that, for my Duchess don't kill.

President Elliot. Have you had any experience in top-working Duchess or any other Russian variety?

Mr. Somerville. I have not top-worked many of them, but would say I have top-worked a number of them on Transcendent stocks. I have the White Russet, worked on a Transcendent stock, that bears very well and is a very fine apple. Then I have the Longfield which I think, from its appearance, will grow as far North as any apple tree from which we can raise apples. The fruit is small in size, but it is of pretty fair quality.

As for the Russians, I think a great deal of them; so much so

that I have set out five acres exclusively to Russian varieties. I will say that I had some varieties that were not fit for anything; they were nice looking, but were neither fit to eat nor to cook, and I have them replaced with other varieties. My experience so far with the Russians has been very favorable, and the showing I have made at the fairs the past two years have shown they have considerable to commend them to the public favor.

Mr. Barrett. Here are these two gentlemen, Mr. Dartt and Mr. Somerville, both intelligent men, who, without question, understand their business, and yet their experiences are right diverse.

President Elliot. Let us have Mr. Peterson's experience first. What has been your experience with the Russians, Mr. Peterson? Have they proved as valuable as you first anticipated?

Mr. Peterson. Some varieties have, and some have not.

President Elliot. Go on and state what have, and what have not.

Mr. Peterson. The Lieby and Ostroff are good. The trees are now 16 years old, I believe, and they had never been damaged in any way before 1887, when a few of the trees had some sunscald. Some of my Russians bear a heavy crop like the Duchess.

Mr. Dartt. I want to make an explanation. Now, the report of my friend Mr. Somerville and my own don't seem to agree, at least some of the members think they do not agree. A little understanding of the situation will make them harmonize a good deal better. I told you that the Tetofsky succeeded pretty well when it was in its prime, just budding into manhood, you might say, just in its vigor, which is the best time for a tree to bear. Mr. Somerville's trees are just in that situation now. They are about eight or ten years old and are just in their prime. Now you wait until they get to be about 18 or 20 years old, and then let them bear exhaustive crops, and have a hard winter, and they may not turn out any better than my Tetofsky. That point must be understood in order to make these reports harmonize.

Mr. Somerville. I sent about a peck of those apples to Mr. Gould, at New Orleans, and he took first premium on those Charlamooffs of mine.

Mr. Barrett. My idea is that with all the explanation Mr. Dartt has given, there is a difference to be considered; and perhaps we have not got at the real merits of this important question. The query in my mind is whether there are not certain geological conditions of the locality and of the soil that make this disparity. I know in the locality where I live the soil is superior. We have no soil in the Northwest that surpasses it, and yet I notice farmers

who treat their forest trees for instance, with the same attention and cultivation and who are equally intelligent and diligent in their work, and who live not very far apart, do not meet with the same success. Now I presume it is impossible for any of us to define just what the real cause is. We want to apply here the principles of agricultural chemistry and geology.

President Elliot. We have another paper that follows in the line of what you are talking about. I wish to say in regard to Mr. Michner, the author, that I learned of his success in apple culture some three or four years ago, and was reminded of him this autumn by the President of the Farmers' Alliance, in asking him the question who were the best apple growers in the state. He named Mr. Michner, and I entered into correspondence with him and through that correspondence have received this paper.

FRUIT GROWING IN MINNESOTA.

By D. K. Michner, of Etna.

I am asked to write a short article descriptive of my successes and failures in fruit raising in Minnesota. My experience dates back to 1858, when as a boy I took pride in helping father plant apple trees, making a plat each spring showing the exact location of each variety; have long since given up the plat business. If your tree ever comes into bearing you will know the variety.

It would be amusing to beginners in apple growing to read a list of the varieties we used to plant in the 50's and 60's and even later.

When the hard winter of 1872 and '73 came our Talman Sweets, Sweet Pear, Red Astrachan, Russets, etc., were ready for the spring clearing up, about the only things left was Duchess and a few crabs.

Then we began to plant Duchess in earnest. Then ventured on Fameuse, Haas, Ben Davis, Wealthy, etc., and we raised some fine crops of these varieties.

The winter of 1884-5 left us plenty of food for reflection. The Duchess had stood unscathed through it all. I think the first planted was about 1865 or 1866.

It would take too much of your time to mention all the varieties and all the top working schemes tried, digging pits, filling up with stones and planting trees on them. It is enough to say I have been through the mill, and that it is amusing to me to listen to pet theories and hobbies which we often read and hear. Though we all have them, mine is this:

An orange tree will stand a certain degree of cold. A peach tree about 20° below. Apples from 20° to 55° or 60° below zero. In the winter of '84-5, in this part of the State, on high ground

the Duchess escaped all right—on low ground, they were in most instances killed or badly damaged. On low land the temperature would be several degrees colder than it was on high land. It is my opinion that 10° colder would have killed every Duchess tree in Fillmore county, at least. Not 10° colder for a day or two and then moderating a little, but down to from 40° to 55° below for days and weeks together, will freeze the life out of anything I have ever tried.

You place a calf on the south side of a wire fence, with only two barbed wires on it, and he may stand it one night against a north-wester, though he may be in ever so good condition for winter, fat sleek, but I think a few days of freezing cold weather will take the life out of him. The same way with the apple tree. It may be thoroughly ripened up in the fall, but a long dry, intensely cold winter will fix it for the spring clearing up.

Now, this is my opinion, based on long experience, though it be in opposition to some of our veteran horticulturists. I am not much acquainted with the Russians. What little success I have had has been mainly with the Duchess. The Tetofsky is as hardy but not as profitable with me. Cannot give you the exact date of planting the first Duchess—about 1865 or 1866. The first Wealthy were planted about the time they were first for sale by nursery-men. Though none of them planted at that time are sound—of 100 bought of Mr. Jewell—some are in fair condition. I kept on planting Wealthy until the winter of '84-5; I think about 1,200 in all. Since then have not planted many. The younger ones were all killed down to the snow line that winter; have let them sprout up from near the ground. They do not make a very handsome tree, for I let them form a protection for themselves. They are just coming into bearing.

My location is what was burr oak and hazel brush land, on the south side of a branch of Root river, about twelve acres in orchard, elevation high, ground sloping in nearly all directions. I do not see that it makes any difference which way it slopes, only on the very highest points the half hardy do best.

The soil is what geologists call loess loam. There is no stone, sand, or gravel, until you get down 33 feet. It is neither sticky clay or sandy, very loose, spades easily to that depth, stands either dry or wet weather well. No particular treatment before planting—just have the ground in condition to raise a good crop of grain. I plant corn among my trees, and cultivate enough each year to give a good healthy growth—not much danger of getting too large a growth. I have planted trees on new ground the second year after being broken. I plow the ground just as I do for any other farm crop, stake off for the rows, then plow two furrows, throwing each way, making a dead furrow. That is good enough for this soil at least, and you will find it saves labor. I used to dig great holes with a spade. That is too hard work and no better.

I prune very little. The less cutting you do the better it is for your tree. My orchard is protected on south and west by cottonwood and soft maple trees. A grove of what is commonly known

as jack oak corners on the northwest; the same kind of grove 40 rods from the north side, soft maples on the east 20 feet apart. South and West wind break is to save the fruit from blowing off, as the winds are more prevalent from that quarter. If I were going to protect my trees, it would be on the East from the morning sun, and on the south. I could show you some as fine Wealthy trees planted on the north side of an oak grove, and close to it, as you could wish to see. Some of my best Wealthy are protected on the east by soft maple, though I have some very good not protected. After planting cultivate a few years; and if you see here and there a bunch of June grass or redtop do not get scared—let it grow, that is, if you are going to follow my plan of raising apples. When I think it does not pay to cultivate longer, I let the grass work in, it will soon get there. After I quit raising crops among the trees I spade around them until I am ready to turn hogs in, that is about the time they come into bearing. After it is well seeded down to grass, the pasturage I get for hogs more than pays all expenses.

I turn my hogs in in the spring as soon as the grass starts. They will do well without any grain. When new corn comes haul in a load, spread it on the green grass; when that is eaten up, give them another load, and so on until winter.

If this does not make it rich enough haul on manure. I have followed this plan on part of the orchard for 12 years. You cannot expect to get large crops of apples without manure, any more than you can large crops of corn. My object in the first place was to kill out the tough sod forming around the trees. But, alas! the more I tried to kill it in that way the more luxuriantly it grew.

It is not likely any of you will try the hog, but if you do, be careful; do not put in too many if your orchard be small. All the wormy apples are eaten; you are not bothered with mice gnawing the trees, and I think the hogs rubbing around the trees help keep the borers away. I do not ring the hogs; they root but very little.

As I am not raising trees to sell I would advise planting three or four year old trees; I prefer those four years old, and never plant any other size if I can get good ones of that age.

We raised 1,100 bushels of apples this year, mainly Duchess. Shipped the greater part of them to Minneapolis. Wealthy and Tetofsky sell here. Ship Duchess and Crabs.

Will speak a word for the old Malinda. We have them in our cellar every winter, and the children will eat them, or they will sell for \$1.00 per bushel. The tree is as hardy as the Wealthy at least. Wish I had more of them.

Then for profit with me the Hyslop is still in the lead, for I cannot depend on the home market.

As you asked for a short article will close, hoping you will have a pleasant and profitable meeting.

DISCUSSION.

President Elliot: Now the point that Brother Barrett wanted to bring out was in regard to geological formation. The lowest formation that he speaks of there, is a sort of clay and shell formation, and he says that at Etna it is 30 feet deep. There are such formations in this state, geologists call them loess formations. After I read that article it set me to thinking about what we had been doing in this direction. Now what called my attention to this particular point was this: A few years ago I started out with a brother-in-law of mine to find a suitable place for a market garden. We traveled all over Minneapolis for a radius of five miles to see where we could locate the best. We took a spade along with us so as to make the best of it; we didn't make any boy's play of it; we went at it as though we meant business and we kept travelling from one place to another, and after awhile we struck a piece of ground and found on that (a piece of 40 acres) different varieties of soil. I said, "You stick a peg here." The consequence was he did so and it was one of the most successful gardens there was any where around the city. The foundation was laid before he went there. He had the stock to draw from, and that is the point I wish to make in regard to this man. Now, he had something there to build on. The reason why we have had so many failures in Minnesota, is on account of bad location, bad soil—

Mr. Barrett: Bad management.

President Elliot: That is it.

Dr. Frisselle: I would like to ask the President what sort of soil he means by shell loam.

President Elliot: We have right close to Minneapolis, a bed of shell formation of marine shells, some of it yellowish and some bluish.

Mr. Latham then announced that there was a basket picnic for the members of the society and their guests to be held tomorrow, and arrangements had been made for the boys from the University Farm School to come up and attend the convention.

President Elliot. I would say that I suppose I am to blame for this invitation which has been extended to the boys at the school. Last year we had our meeting at Minneapolis, we extended an invitation to them to come over and visit us one day, and they were very much entertained, they said. This year I corresponded with Professor Pendergast about it, and he said he would inquire and see how many of the boys would come. He reported that there would be about fifty who would like to come out here one day and see the

working of the State Horticultural Society. It was arranged for a basket picnic to be held during one day of the convention, and we have changed that from Friday to Thursday. It will interfere some with the program but we will try to get through with it just the same.

The discussion was then resumed.

Mr. Barrett. Now, this is a fact with which most of us are familiar, that nature's processes of preparation for the growth and development of fruitage and plants is perfect; that certain plants cannot grow in certain soils. Take the apple for instance. A few years ago in Wisconsin (I was a resident of that state before coming to Minnesota) a great many were trying experiments in the eastern part of the state in raising apples. They failed and there was great discouragement but they kept at it and now they have made it a success. Prof. Green is familiar with this fact. Take phosphate of lime from the rock and pulverize it to the utmost capacity and apply it to your plants. Then take phosphate of lime from the bone of an animal and apply it in the same way and you will find a wonderful difference between the phosphate of lime in the rock and that in the bone. If we can post ourselves in geology and agricultural chemistry, be better posted in its processes of refining, developing, quickening and electrifying, as far as it is possible, we will make a better success; but we must be better students. We have based our conclusions largely upon experiments and we should back it with a certain degree of scholarship or information that carries the work to a better success. To this end, I believe, we should make some kind of arrangement under the auspices of our society by which we can get more information upon this topic before the society.

Mr. Dartt. I believe the paper we have heard read is a good one. It is good because it is founded upon experience. It illustrates a fact and makes the fact plain to us. At the same time, I do not think it is best for us to waste a great deal of time in trying to understand all the processes of growth; I think it is impossible for any man to tell exactly how the blades of grass grow.

Mr. Somerville. There is no doubt a difference in locations. Where the ground is sandy and gravelly you cannot expect to raise crops with the same success as on a better soil. Where I live there have been many efforts made trying to raise fruit; there have been many sad failures as well as some successes. It depends more, taking the country at large, on the care and attention paid to the orchard than there really exists in the location, unless it is something remarkable like that of Mr. Sias. Take the country in

general, with the same amount of care and kind of cultivation, I think the apple can be raised on most any place. I am satisfied this is so from my experience.

Mr. Pearce. I see that a number of those papers have alluded to hogs in orchards. I made up my mind a number of years ago that the hog was a scavenger and not fit to eat, but I have noticed that wherever an orchard had a fence around it, and a lot of hogs were in there, I always found good trees. When I was at Pleasant Grove, which is settled by people who keep hogs, I noticed a hog pen and in that hog pen was an apple tree, and I must say I never found finer apples or a more thrifty tree, and it converted me so I now believe hogs are essential to an orchard.

Mr. Dartt. It is the manure.

Mr. Pearce. No, it is not that exactly; I have made up my mind to that fact. I have said nothing about it; but I have set out an orchard of trees and have it so arranged that I can keep hogs there during the summer season.

Mr. Dartt. If you can't cultivate, turn in hogs.

The following paper was then read by Mr. Harris:

A DESCRIPTION OF AND BRIEF NOTES UPON SOME OF THE VARIETIES OF APPLES THAT ARE OR HAVE BEEN GROWN IN MINNESOTA.

By J. S. Harris, La Crescent.

Mr. President, members and friends of the Minnesota State Horticultural Society: A history of the Horticulture of Minnesota, the labors, trials and untiring perseverance under the greatest difficulties that have impeded the progress of the art in any country in the known world, would portray many deeds of heroism and self sacrifice that would endear the memories of the old pioneer horticulturists of other states to future generations and make a precious volume to bequeath to our descendants. But the task of collecting the material and compiling such a work is too great to be undertaken by a man of my age and financial and literary ability. It is to be hoped that it will be undertaken before the last of the actors in the drama have passed in their checks and gone over to the other shore. This state has always been noted for the energy and liberality of its people and has from the first been a favorite field of operations for nurserymen, agents and the pedlars, and hundreds of thousands of dollars have been drawn from it for untried and worthless varieties of trees, and at one time it

was the favorite dumping ground for the rubbish that ought to have ended its existence in the brush piles. Happily, good and honest nurserymen sent trustworthy agents to us with well grown and skillfully handled trees; but unfortunately the country was new and the climate different from other parts of America and no man could tell which if any would thrive here. Hundreds of varieties have been planted here and dozens of them have fruited, and at one time or another been thought to be sufficiently hardy or to have merit enough to give them a place in our pomology, and we have held on to them with more than a commendable tenacity. Theories without number have been advanced and recommended but succeeding climatic causes have demolished them all, and we have finally come to the conclusion that "Nature's" economic distribution of trees and plants has been a thing of chance, and that our fruit growers must look for the fruits of the future to come to them only while working along the lines, 1st of, "Introduction of like fruits from like climates," which was first advocated by Col. D. A. Robertson, and has been started in practice by J. L. Budd, of Iowa, C. Gibb, of Canada, A. C. Tuttle, of Wisconsin, and others. 2nd, "By systematic plant breeding," as started by Gideon, Leudloff and many others. The introduction of the New Russian, and seedlings that are being originated has in a great measure stopped the replanting of our orchards with those varieties that were termed iron clad twenty years ago, and before another twenty years have passed it is doubtful if even the Duchess, Tetofsky and Wealthy, will occupy a prominent place in the estimation of our planters. To aid the future historian and simplify the work of cataloging by your committee, I present the following imperfect list of descriptions and brief comments on some of the varieties that have fruited in this state.

ALEXANDER, EMPEROR ALEXANDER.

Fruit large, conical, somewhat flattened at the base; red streaked on greenish yellow ground; stem small, cavity deep; calyx large, basin deep; flesh coarse, crisp, yellowish white, tender and juicy; flavor a pleasant acid; use kitchen and market; season in Minnesota, September to November; origin, Russia. For beauty on the tree this variety will probably bear away the palm. Nearly hardy in southeast Minnesota until the winter of 1884-5, when most of the trees were considerably injured. Tree a strong grower; somewhat subject to blight. Specimens were grown last season by a Mr. Anderson, of Houston county, measuring 15 inches in circumference. It is one of the first varieties planted west of the Mississippi river. Is rather a shy bearer. Is usually on exhibition at our State Fairs.

AMERICAN GOLDEN RUSSET.

Size, medium; form round, or roundish, ovate; color, rich golden yellow, overspread with soft russet, and in the sun a marbling of red; stem slender, cavity narrow; calyx small and closed, basin shallow; flesh yellow, tender, juicy, with a rich sprightly sub-acid flavor. Season, December to March. The tree is a medium, com-

pact grower, strongly inclined to lean towards the northeast. The fruit is popular for market and table. It keeps best closely headed up in barrels. Previous to the winter of 1884-5, this delicious apple was considerably grown from St. Paul south and west to the line of the Iowa & Minnesota railroad. The tree is not hardy, is only a moderate bearer and suffered frequently from bark burst and sun scald. A few trees are still fruiting in Houston county. The same description will apply to the English Golden Russet, except that the fruit is smaller and the tree grows more upright.

AUTUMN STRAWBERRY.

Fruit medium, form roundish-conical; color, nearly the whole surface streaked with light and dark red, stem tender and rather long, cavity open; calyx small, basin, shallow and slightly ribbed; flesh yellowish white, tender, crisp and juicy; flavor good sub-acid. Season, September and October good for table and market. The tree is a vigorous, rather spreading grower and productive, and ranks about with Saps of Wine for hardiness. It is a more valuable tree and fruit than the early strawberry. I have never seen it grown except in Houston and Winona counties.

EARLY STRAWBERRY.

Fruit roundish, a little below medium in size, and tapering towards the eye. Skin smooth and fair; finely striped with a light and dark red on a yellowish white ground. Stem long and slender, inserted in a deep cavity; calyx small, basin shallow, flesh white and soft, with a sub-acid brisk flavor and agreeable aroma. Tree an erect grower and early bearer. Tender.

BARTLEY SWEET.

Fruit large, round ovate; color clear deep reddish crimson with an occasional whitish patch; stem slender, cavity narrow and deep, calyx closed, basin medium, flesh yellow; rich, not very juicy, sweet and very good. Season here October to December. Tree is vigorous and productive, upright while young, spreading and drooping as it gets old, and much inclined to lean away from the sun. Was grown and fruited in Houston and Winona counties until 1884-5. Not hardy.

AMERICAN GOLDEN PIPPIN.

Fruit large, form variable, oblate, globular, or conical, and sometimes angular or ribbed. Color a fine golden yellow, occasionally a soft blush on cheek. Stem short and stout, inserted in deep cavity. Calyx closed, basin irregular, flesh yellowish, tender, juicy, almost melting, flavor rich, refreshing, aromatic; core large. Season November to January. I planted quite freely of this variety in 1859, and for a number of years it bore well and promised to be valuable. The winter of 1872-3 wiped out every tree root and branch together with some fine seedlings of it that were promising great things.

COOPER, KNOWN HERE AS UTTER'S LARGE, LUCY AND WINONA CHUP.

Fruit roundish oblate, skin greenish yellow, with a few stripes and splashes of red, thickly sprinkled with brown dots. Stem short, cavity deep and slightly russeted; calyx small closed, basin deep, flesh tender, vinous, pleasant; but not high flavored. Season October to December. The tree is vigorous, upright and productive, not hardy, but has vitality enough to recover from pretty severe injuries.

This variety found its way into Winona county at a very early day and was extensively propagated and sold throughout the surrounding region, by S. Bates of Stockton. For several years it enjoyed great popularity. But few of the old trees now remain. It was on exhibition at the last State Fair and at the Houston County Fair were specimens measuring $14\frac{1}{2}$ inches in circumference. Does the best on high limestone ridges.

BEN DAVIS.

Fruit large, roundish, narrowing a little to the eye. Skin beautifully striped, splashed and marked with bright red on a yellowish ground. Stem rather short, deeply inserted in a narrow deep somewhat uneven cavity; calyx closed in a deep angular basin; flesh white, tender, juicy, with a mild, sub-acid, not very high flavor.

On account of its beauty and keeping qualities it is a popular market sort. The tree is a vigorous grower and abundant bearer. It was introduced into Minnesota about 1866 or 1867, and for a few years was extensively sold and planted as a true Iron-clad. Being an early bearer it survived long enough to bear two crops of fruit, but is now no longer planted.

DOMINE.

Fruit, size medium, form oblate, color greenish yellow in the shade, with stripes and splashes of bright red in the sun, and pretty, large russet specks. Stem long and slender, in a wide cavity. Calyx small, basin broad and moderately sunk. Flesh white, tender and juicy, with a sprightly pleasant but not high flavor. Tree a rapid grower, and great bearer. A long keeping winter fruit. In eastern Wisconsin and northern Illinois this variety has proved one of the hardiest of the old Iron-clads, but in this state it has never given any great promise.

DUCHESS OF OLDENBURGH.

As grown in this state the fruit is from medium to large, and frequently very large. Form regular and roundish. The skin is smooth, finely washed and streaked on a yellowish ground; stem medium in a wide cavity. Calyx large, basin broad. The fruit when ripe is covered with a faint blue bloom. The flesh is rich and juicy, with a rather acid, pleasant flavor. Use, cooking and market. Season, August and September. Origin, Russia. The tree is a fairly vigorous grower, and an early and profuse bearer.

It responds nobly to good cultivation and rich soil. Its introduction into Minnesota was a God send to the people, probably one-fourth of the volume of all the standard apples at this time produced in the state are of this one variety. It is unexcelled for cooking, and may be used when not more than half grown. Hardy nearly everywhere.

FALL ORANGE.

Fruit large, fair, roundish ovate. Skin pale yellow, sometimes with dull red cheek, and sprinkled with brownish dots. Stem short, inserted in deep narrow cavity; calyx large, partially closed, basin rather deep and narrow, flesh white, tender, juicy, subacid. Good for cooking. Season, October and November. Has fruited over a considerable portion of southeast Minnesota. The best trees I have seen of it in the state were on the grounds of Truman M. Smith, in St. Paul. Has not succeeded since 1872.

POMME DE NEIZE OR FAMEUSE.

Fruit of medium size, roundish, somewhat flattened ground; color, pale greenish yellow, covered with faint streaks of pale red on the shady side, marked and blotched with darker red and becoming a fine deep red in the sun. Stem slender, $\frac{1}{2}$ inch long, cavity narrow, calyx small, basin narrow and rather shallow. The flesh is remarkably white, tender and juicy; flavor good. A very popular dessert fruit. This variety was quite extensively planted in southeast Minnesota. A few trees yet remain that have partially recovered from injuries received in '84 and '85, but from the fact that the Wealthy is more hardy, bears younger, and is of very nearly as good a quality, the Fameuse is no longer planted. Its origin is supposed to be in France.

GILPIN, LITTLE RED ROMANITE.

Fruit small, very handsome, roundish-oblong, skin very smooth, richly marked and streaked with deep red, over a yellow ground. Flesh white, rather dry, firm, rich, and very good. Season, April. Very productive. At one time extensively planted but soon succumbed to blight, canker, and our hard winters.

JEFFERSON COUNTY.

Fruit of medium size, round and regular; skin greenish-yellow, marbled with red and russet on the sunny side; flesh crisp, juicy, tender, mild and sub-acid and excellent. The tree is an early and great bearer, and was a great favorite with John Hart, of Stockton, Winona county. Since his removal from the state it has been lost sight of.

BLUE PEARMAIN.

Fruit large, roundish, regularly formed, slightly conical, skin covered with stripes and blotches of dark purplish red over a dull ground and appearing bluish from the white bloom. Flesh yellowish, mild, rich and good. Tree a strong grower and moderate

bearer. Was for some years a favorite with the Germans in Houston Co. Most of the trees were destroyed in 1873 by root killing.

PRICE'S SWEET.

Fruit medium or a little under, form round, oblique, conic; skin yellow, mostly covered with red stripes and dots; flesh white, tender, sweet, without much flavor. The tree is a vigorous grower, an early and abundant fruiter, subject to patch blight in the forks and very short lived.

Was first introduced into this state by the late P. A. Jewell. It has a bad habit of dropping a large portion of its fruit before time for gathering. Keeps well through the winter.

ST. LAWRENCE.

Fruit large, oblate, tapering towards the eye. Skin yellowish, striped and splashed with carmine. Stem medium length, inserted in a large cavity. Calyx firmly closed, being small and deep; flesh white, slightly stained, crisp, juicy and tender, flavor vinous. Season here, October. Tree vigorous, upright and productive when it gets its age. One of the hardiest of our old list and formed the largest tree of any variety planted in this state. Succeeded very well with me until since 1885.

JONATHAN.

Fruit of medium size, regularly formed, roundish ovate, or tapering to the eye; skin thin and smooth, the ground clear, light yellow, nearly covered by lively red stripes and deepening into brilliant dark red in the sun; stem rather long and slender, set in a deep regular cavity; calyx set in a rather deep broad basin; flesh, white, often pinkish, very mild and juicy, with an agreeable sprightly flavor. Season, November to March. Origin, Kingston, N. Y. Tree, an early and abundant bearer; fruit, very popular on account of its beauty and high quality. Was introduced by the late P. A. Jewell, and for a few years did very well, but finally succumbed to blight and injuries from the winter of 1884-5.

MACMAHON WHITE.

Fruit, large, roundish, narrowing a little to the eye; color light greenish white, sometimes showing faint stripes of bluish on the south side; skin smooth and clear; stem medium, in a deep cavity, somewhat russeted; calyx nearly closed, set in a medium somewhat corrugated basin; core medium; flesh white, tender and juicy; flavor an agreeable acid; use kitchen and market; season October to December; origin, Wisconsin. The tree is a vigorous and symmetrical grower, and fair fruiter. Nearly hardy in Southern Minnesota, and is being extensively planted.

NORTHERN SPY.

Fruit large, conical flattened; skin thin, smooth; in the shade greenish yellow, in the sun covered with light and dark stripes of

purplish red, marked with a few pale dots and a thin white bloom. Stem $\frac{3}{4}$ inches long, rather slender in a wide, deep cavity marked with russet. Calyx small, basin narrow, abrupt, furrowed; flesh white, fine grained, tender, slightly sub acid, flavor delicious. The tree is an upright rapid grower.

PLUM CIDER.

Size above medium, form round, ovate; skin yellow, more or less striped with light and dark red; flesh yellowish white, juicy, sub-acid. Use kitchen and market. Season, late autumn. Origin, Wisconsin. Free, medium, hardy, upright grower—productive and moderately good bearer, but does not commence fruiting until it gets very old; originated near Rochester, N. Y. Trees of this variety were quite extensively planted in Southern Minnesota about 1860, and for a time gave promise of success, but after bearing a liberal crop of fruit in 1872, the trees were totally destroyed during the following winter, and it is no longer planted.

POMME GRISE.

A small gray apple, introduced from Canada. Not a strong grower, but is a good bearer; fruit below medium size; form oblate; skin greenish gray, or cinnamon, russet, tinged with red towards the sun; calyx small, set in a round basin; flesh tender, rich and high flavored; season December to January. Tree ranks in hardiness about with Golden Russet. Has been grown to some extent in Southeastern Minnesota.

SAPS OF WINE, OR EARLY WASHINGTON.

Fruit medium, form roundish ovate; color yellow and red, shaded and splashed with deep red, and sprinkled with white and gray dots, and covered with a thin bloom; flesh white, often stained with red, a little dry, with a mild, pleasant subacid flavor; origin Europe. The tree was vigorous and productive while young, and gained considerable favor previous to the winter of 1872-3. Not suited to this climate, and no longer grown in this state.

RED ASTRACHAN.

Fruit medium; color greenish yellow, mostly overspread with dark crimson red, and a white bloom; form roundish, tapering towards the calyx; a little russet near the stem, which is generally short; cavity narrow; calyx large, basin shallow; flesh white, juicy, acid; season, August. The tree is of foreign origin, and has a most beautiful form; rather slow about commencing to bear. It was introduced as a strictly iron-clad, and quite extensively planted, but proved to be unadapted to Minnesota.

HAAS, OR FALL QUEEN.

Medium to large, flat ribbed, or quartered; skin yellowish green, streaked and nearly covered with dull, brownish red; flesh white, juicy, subacid; use, kitchen and market; season September to November. Tree, a vigorous tall grower; nearly hardy; origin,

Missouri. This variety has been extensively planted in Southern Minnesota, and succeeded well up to 1884 and 1885. Is improving again.

TALLMAN SWEET.

Size medium, color pale, whitish yellow, form roundish; flesh firm, rich and sweet; a great favorite for cooking. Tree a strong grower, very productive, and the fruit keeps well into the winter. The trees mature their growth rather late in the fall, and are somewhat subject to bark burst. One of the most valuable of the old varieties for high and dry situations; is not being replanted since 1885.

WESTFIELD SEEK NO FARTHER.

Fruit large, regular, round, tapering a little towards the eye; skin a pale or dull red, over a pale clouded green ground, the red sprinkled with russet yellow dots; stem slender, inserted in an even cavity; calyx closed, and set in an even basin of moderate depth; flesh white, fine grained, tender, with a rich pearmain flavor; quality best. Season early winter. So far as I know, has fruited only in Houston and Winona counties. Tree tender.

TETOFISKY.

Fruit of medium size, oblate conic, sometimes nearly round; skin smooth with a yellow ground, handsomely striped with red, and covered with a whitish bloom. The flesh is white and juicy, with a sprightly and agreeable flavor. Season August; origin Russia.

The tree is a close very upright grower, making it well adapted for the garden and limited grounds; is hardy and doing very well over a considerable portion of the Northwest. One of its greatest drawbacks is that the fruit is very perishable and will not bear rough handling. It was first sold in this state by the Beaver Dam Nurseries of Wisconsin as Russian Crab, and travelling tree tramps took up the cue and sold to our people thousands of trees of the most worthless of the crab family.

WILLOW TWIG.

Fruit medium to large, roundish, slightly conic, sometimes oblate; color of skin, light yellow, shaded and marbled with dull red, and sprinkled with numerous russet dots; stem rather short and slender; cavity narrow, and frequently lipped; calyx partially closed, basin, abrupt corrugated. The flesh is not very tender, nor the quality very good. Its value is as a long keeper, and it is too tender in tree, for any part of Minnesota.

PERRY RUSSET.

Fruit, medium to large; form, round-conical; color, light green, overspread with russet; flesh, fine grained, crisp, subacid, good; season winter. Tree grows into a thick, compact head and is nearly hardy. Very shy bearer.

PLUM CIDER.

Fruit, size medium; form, round-conical; color, greenish yellow, striped with red; flesh, tender, juicy, flavor subacid, good; use, kitchen and market; tree, an erect, vigorous grower, good fruiter and about half hardy; origin, supposed to be Wisconsin.

WALLRIDGE.

Size, small to average; form, flat-round; color, light greenish yellow, striped and splashed with light red; very smooth skin; flesh, white, fine grained, crisp, juicy; flavor, sprightly, subacid. A beautiful apple and long keeper; tree, vigorous and enormous bearer. Sometimes does not ripen its growth well and is seriously injured in some of our severest winters.

WEALTHY.

Size, medium; form roundish-oblate; color, red, fleshwhite, often tinged with red; flavor, subacid, good; use, family and market; season, early winter; origin, Minnesota. The tree is a symmetrical and vigorous grower; commences to bear young and is inclined to over bear; is medium hardy but somewhat subject to blight. Excepting the Duchess it is the most profitable variety yet tested for planting in eastern and southern Minnesota.

PEACH OF MONTREAL.

Fruit medium in size; form, round-conical, smooth; color, when ripe, light yellow or straw; flesh yellowish white, fine grained, juicy, flavor rather acid; season same as Duchess, quality rather better. The tree is hardy and thrifty and seems to be adapted to a variety of soils; it does not bear as well as the Duchess or ship so well, and the fruit must be picked and handled carefully, but I believe it is worthy of more general cultivation; whether it is a Canada seedling or a true Russian I am not able to say.

KLUEVSKOE (28 M).

Grown by Wm, Somerville, Viola, Minn. Size, medium, flat-conical; color, pale green with splashes of pale red on sun side; stem short; cavity rusty, calyx closed, flesh greenish white; acid; use, cooking; season Winter.

HIBERNAL.

Size, large; form, flat-conical; color, greenish yellow; striped with red on the sun side; stem medium; set in a medium open russeted cavity; calyx closed, set in a closely wrinkled basin; flesh white, tender, acid; season, late Autumn; use, kitchen; origin, Russia; Tree, a tardy bearer.

ANTONOVKA.

Size, large medium; form, flat-conical, ribbed; color, greenish-yellow, shaded with brown in the sun; stem short, set in a medium yellow-russeted cavity; calyx, half open; basin, deep ribbed; flesh, greenish yellow, firm, pleasant, acid; use, table and cooking; season, early winter; origin, Russia.

MONTREAL BEAUTY.

Size, medium to large; form, round-oblong, frequently oval; color, yellow and red, covered with a whitish bloom; quality, good. Season, September; tree, hardy and productive but subject to blight.

MINNESOTA CRAB.

Size, very large; form, round-oblate; color, pale yellow and light red; flesh, white, fine-grained, melting, flavor, very good; season, October and November. The tree is hardy but a slow and irregular grower, and shy bearer but improves with age.

MEADER'S BLUSH.

Size, large; form oblate; color, pale yellow with brown dots and shaded blush; flesh, yellowish white, juicy, fine grained; quality, fair. Tree not a strong grower or good bearer. Season, October.

BEAUTY OF MINNEAPOLIS.

Size, medium to large; color, clear, yellowish white or straw color; quality, superb; season, September; tree tender, origin, Minnesota.

PRIDE OF MINNEAPOLIS.

Size large, form round-conical; color whitish green, turning to yellow, often clouded with gray; flesh pale yellow, crisp and juicy; quality good pleasant acid; use, kitchen and cider. Season, October. Tree hardy and productive. Origin Minnesota.

ELLIOT'S SWEET CRAB.

Size medium to large; form round-oblate; color orange and bluish; flesh yellow; rich flavor, sweet and good, stem long. Season, October. Tree nearly hardy, heavy bearer. Origin, Minnesota.

KENYON'S ALASKA CRAB.

Form round, slightly ridged; size large; skin yellow, striped and blotched with bright red; stem short, set in shallow cavity; calyx small and closed, set in a broad, shallow or flat corrugated basin. Flesh yellow, tender and juicy; flavor good, sub-acid. Use, cooking. Season, October to December. Tree vigorous, symmetrical, nearly hardy, somewhat subject to blight. Origin Iowa.

MAIDEN BLUSH CRAB.

The most delicious crab known.

Large, round oblate; color pale yellow with blush on sun side. Stem medium, set rather deep in medium cavity; calyx closed, set flush on a corrugated eye; flesh yellowish, mild, sub-acid, pleasant aromatic flavor. Season, October. Use, desert and cider. Tree fairly hardy and rather a slow, symmetrical grower. Origin Iowa. Fairly productive.

FRUIT CATALOGUE.

EXPLANATION OF ABBREVIATIONS.

The size is understood by l. for large, m. for medium, s. for small. Form, r. for round, r. c. roundish conical, ob. oblong, r. ob. roundish oblate, fl. flat. The color, r. red, y. yellow, y. r. yellow and red, y. rus. yellow and russet. Quality, g. for good, v. g. very good, b. best. Season, s. summer, a. autumn, l. a. late autumn, w. winter. Uses. 10 points is the highest. These characters only designate leading positive features.

The work of compiling descriptions and arranging catalogue has been under consideration for several years, and yet owing to the last season being unfavorable for many varieties, the difficulty of securing specimens for examination, and having to trust to memory, we expect our report will contain some errors and come very far short of perfection, but the errors may be corrected and the descriptions improved upon in the future.

JOHN S. HARRIS,
Chairman of Com. on Catalogue.

NAME.						Use and Value Scale of 10 Points.				REMARKS.
	Size.	Form.	Color.	Quality.	Season.	Hardness.	Desert.	Richness.	Market.	
Alexander.....	L	ob. c	r s	Fair	A'tm'n.	8	2	8	10	Origin, Russian. Tree Strong upright grower
American Golden Russet.....	M	r. ob	y rus	v g	Winter	6	10	6	10	Shy bearer in Minn. Origin America.
Autumn Strawberry.....	M	r	y r	v g	L A	6	8	8	7	Tree subject to canker. Origin America.
Early Strawberry.....	S M	r	es	v g	E A	4	8	8	4	Origin America.
Baily Sweet.....	L	r c	rs	v g	L A	6	10	7	10	Origin America. Tree gets more hardy with age.
Ben Davis.....	L	r c	y r	g	W	6	6	6	10	Origin America.
Blue Pearmain.....	L	r c	r	g	W	7	5	5	10	Origin America.
Coopers or Utter Large.....	L	r ob	g y r	g	L A	7	6	8	10	Tree fruits young.
Fall Pippin.....	L	r ob	gy	v g	L A	7	10	8	10	Origin America.
Am. Golden Pippin.....	L	r ob	gy	v g	L A	5	10	8	10	Round top. Strong grower.
Haws.....	L m	ob c	y r	g	L A	8	4	6	10	Origin America.
Fall Queen.....	L m	ob c	y r	g	L A	8	4	6	8	Upright shy grower.
Gilpin Little.....	S	r c	y r	g	W	6	4	4	6	
Red Romanite.....	S	r c	y r	g	W	6	4	4	6	
Jonathan.....	S M	r c	r	v g	W	5	10	8	10	Tree bears young.
Northern Spy.....	L	r c	y r	v g	W	5	10	10	10	Very slow coming to bearing.
Duchess of Oldenburgh.....	M-L	r ob	y r	g	S	10	5	10	10	Origin Russia. Tree abundant bearer.
Peach.....	M	r c	Straw	g	Sm	10	5	8	8	Origin France. Tree stands erect, shy bearer while young.

NAME.						Use and Value on Scale of 10 Points.					REMARKS.
	Size.	Form.	Color.	Quality.	Season.	Hardness.	Dessert.	Richness.	Market.	Origin.	
Perry Russet...	L M	r c	rus	g	W	8	6	8	8	Am	Shy bearer except in dry limestone soil.
Domine.....	L M	rob	yr	vg	W	7	7	7	8	Am	Never bears well in Minn.
Pewaukee.....	M L	r c	rs	vg	W	7	5	5	8	Wis	A failure in Minn.
Price's Sweet...	S M	r ov	rs	g	L A	6	5	5	6	Am	A young bearer, S. E. Minn.
Fall Orange....	M L	r	yr	g	L A	6	5	8	8	Am	N. E. Minn.
Plum Cider.	M	r c	gyr	vg	A	7	5	7	7	Wis	S. E. Minn.
Pomme Grise..	S	r ob	yrus	best..	W	6	10	8	5	F	S. E. Minn.
Red Astrachan..	M	r	r	vg	S	6	4	8	10	F	S. E. Minn.
St Lawrence...	L	fl	yr	vg	E A	8	8	6	10	Am	S. E. Minn.
Famuse or Snow	M	rob	rs	vg	W	7	10	8	10	Am	S. E. Minn. Superceded by wealthy.
Saps of Wine..	M	e	yr	vg	S	6	7	....	6	Am	S. E. Minn.
Early Washing- ton.....	M	e	yr	vg	S	6	7	....	6	Am	Discarded.
Tetofsky.....	M	r c	yr	g	S	10	6	....	8	R	Good for garden culture.
Wealthy.....	L M	rob	r	vg	W	8	9	8	10	Minn	Southern half of state.
Westfield, Seek- no-further...	M L	r c	yr	best..	W	6	10	6	10	Am	
Willow Twig...	L M	r	yr	vg	W	7	4	6	8	Am	
Walbridge.....	M	rob	rs	vg	W	6	6	8	5	Am	
Edgar redstreak	M	rob	rs	vg	W	6	6	8	5	Am	
Tallman Sweet- ing.....	M	r	gy	vg	W	7	7	10	10	Am	S. E. Minn.
McMahon white	L	r c	gw	vg	W	8	5	10	10	Wis	Doing nearly as well as Duches S. E. Min.

NEWER RUSSIAN APPLES

NAME,						USE AND VALUE, Scale of 10 Points.				REMARKS.
	Size.	Form.	Color.	Quality.	Season.	Hardness.	Dessert.	Richness.	Market.	
Anis yellow....	S M	f c	yr	g	A'tm'n.	10	6	6	5	
Autumn Streak- ed or Green Streaked.....	M L	obc	gs	g	A	9	8	6	8	Appears to stand well in S. E. Minn.
Antonovka.....	L M	yc	gy.	vg	E W	....	....	....	....
Charlamoff....	M L	flr	ysr	vg	Sum	....	....	....	....
Christmas.....	M	r c	yr	vg	E W	....	....	....	....
Hibernal.....	L	flc	ysr	vg	E W	10	4	10	....
strokoff (4 m.)	M	r	gb	vg	W	10	8	....	....
Kluvekoee, (23 m)	M	flr	gyr	g	W	10	0	8	....

CRAB APPLES AND HYBRIDS.

						VALUE. Scale of 10 points.			REMARKS.
	Size.	Form.	Color.	Quality.	Season.	Desert.	Kitchen.	Market.	
Baker Sweet.....	M	r	r.	v.g.	E A	5	6	5	Hardy.
Briar Sweet.....	L	r.c	r.y.	v.g.	A	6	8	8	
Early Strawberry...	M	r.	r.s.	r.	S	8	6	5	
Hyslop.....	L	r.	r.	r.r.	A	3	6	10	
Minnesota.....	VL	ob.	y.r.	r.r.	W	6			Subject to blight. Hardy.
Montreal Beauty..	M	r.ov	y.r.	r.r.	A		8		
Orange.....	M	r.	o.	r.r.	L A				
Sweet Russet.....	L	rc.	y.r.	v.g.	A	10	10		Too shy bearer. Hardy.
Sylvan Sweet.....	L	r.fl.	y.r.	r.	A	6	8	8	
Transcendent.....	L	r.ob.	y.r.	r.	A	4	10	10	Subject to blight.
Whitney, No. 20...	L	r.fl.	r.s.	v.g.	S	8		10	Not quite hardy.
Maiden's Blush....	L	r.ob.	y.b.	b.	A	10	8	8	Excellent for cider.
Alaska.....	VL	r.	y.r.	g.	L A	6	8		Subject to blight. M. H.
Pride of Minne'olis	L	r.c.	y.y.	v.g.	L A		10	4	Good for cider and canning.
Elliot's Sweet.....	M	r.ob.	o.	r.	L A		10		Fruit very rich. Tree M. H.
Meador's Blush....	L	r.ob.	y.b.	fair	L A				No value.
Beauty of Minap'ls	M	r.c.	straw	b.	A	10			Tree tender.
Powers.....	S	fl.	y.r.	v.g.	A		10	8	Hardy and productive.

FRUIT MAP OF THE STATE.

President Elliot. Now I want to call your attention to a matter of great importance that I want Prof. Green to explain.

Prof. Green then said that President Elliot had suggested to him that it would be a good plan to get up a map of the State of Minnesota, on which it would be shown in which districts apples had been grown successfully, and where they had not been grown successfully. He stated he had prepared the two maps exhibited simply to start a discussion.

President Elliot said there was one point that Prof. Green did not touch upon with as much emphasis as he would like. We can't go on with this investigation unless we have the co-operation of every man that is interested in apple culture in Minnesota. We want you to stick a pin right there and we are going to hold you responsible for the success of this map. If we can't have your aid and assistance we might just as well give it up. We have no funds to put one or two men in the field and send them all over the state to make a survey. When you get home sit right down and give us the data, if you can, when the trees were planted, their location, section, township and as nearly as possible all

those you know of. If you will do that, and forward such information to Prof. Green, why next year I am in hopes we shall show you something of progress.

Mr. Dartt, Mr. President, I suppose that this would be something like a merchant in trade taking an account of stock. We want to find out just where they all grow. Well now, the reports that you get will depend some thing upon the feeling of the reporter. For instance one man is very sanguine that apples can be successfully grown, he believes they are successfully grown and will report success; but when you get another man who thinks you can't grow apples in Minnesota, and who thinks you can't grow any kind of fruit, his report will lean the other way, wont it? When you get them all in, there will be some localities that will be overestimated and there will be others that you will get poorer reports from than you are entitled to. So it seems to me it would not be really reliable. And suppose you did know would your chances be any better in the future? We are depending upon new varieties. Wont we get our new varieties just as quickly if we let bygones be bygones? Wont we progress just as rapidly and more so than we will in any other way? Now, there is one question that was raised last year. One member made the remark that he thought there had been more apple trees planted in the last ten years than ever before that. Now the question will probably be settled by the next census and they will report the number of apple trees planted and the extent of the apple crop. What data we get there will be reliable.

President Elliot. We thought by getting the good reports and the bad reports together we could sift them out and come to some conclusion as to what was feasible in some localities. Now we have a fruit list committee that is at work getting up a fruit list for this State. We have a State here of pretty broad dimensions and we must institute some method so that we can shut out the selling in certain localities of stock that is worthless and not reliable while the same stock in another part of the State, say in the southern tier of counties would be all right experimentally; but when you take it up in the northern part it is of no avail and it is for this purpose we want to get this information and we want to pick this thing to pieces. If it is not going to be of any value we want to know it and that is why the subject is brought up.

Mr. Harris. Mr. President, I think this is a move in the right direction; we have committees appointed but they have no map of the state before them and have no data to go by to show in what parts of the state any one variety of fruit could be produced.

When this map is finished it will show, for instance, the northern line where the Duchess can be successfully grown. We hope to find in those Russians a dozen or more varieties yet that are as hardy as the Duchess—we want to find something hardier than the Duchess, something that will thrive. We also want to find where strawberries and crab apples can be grown; and on a map of that kind it will be shown where such things as that succeed and a stranger coming into the state and wishing to locate where he can grow certain things, by looking at that map can locate in the best place.

Dr. Perkins said that when he was a boy living on the borders of the Genesee Valley, in New York, it was then the great fruit producing belt of this country. Since then, it has been extended farther and farther. It was formerly in the southern part of this state but it has now gone farther north and west. Clover has followed. When he came to this state it was almost impossible to raise clover. The clover belt has followed the wheat. Now the question is: is not the fruit bearing belt following the wheat belt and is it not impossible to define a belt that will remain very long? I can remember a little awhile ago in Minnesota they told us that we couldn't grow anything but crabs; and I guess you will all bear me out in that; but now by the look of the table here in front of us, and our fairs and what we have seen here today, we can grow apples. Now, isn't fruit doing just the same thing that the wheat and clover belt has been doing?

Mr. Barrett. It seems to me the Doctor has got the right hold of this thing. Now here is a gentleman from Manitoba, a Mr. Frankland, a member of our Society who was here last year, who assures us that in that locality up to $49\frac{1}{2}$ degrees he is making quite a success and he believes from what experience he has had, that he will make better success with the Russians than we are doing here.

Mr. Pearce. Mr. President, I don't exactly favor that method. Last season I advocated experiment stations in every county in the state, and I do today. If an individual would take hold of a station of that kind and test all the varieties, I think it would give more general satisfaction than any other system. From a county that has only twenty-five or forty or fifty farmers in it, we don't get a general return. Take it again where almost every farmer is making an effort to raise fruit, if you could see their reports you would think it was a tremendous place for apples. Take it in Fillmore county; let a report come from every man that is raising apples there, and you would say, why, it is beating the

world. Now, here is a county that is, perhaps, just as good as Fillmore, but in place of twenty-five thousand inhabitants it has only fifty or five hundred, and only a few individuals making any effort to raise fruit. What kind of a report will we get from there? Now, I think the way is to establish an experiment station which would cost the society really nothing. Put some good man at the head of it; let him test all those varieties, and we would get a report that we could depend upon.

Mr. Harris. Mr. Pearce favors experiment stations in every county in the state. If we could have experiment stations it would be all right; but who is going to run them? I think these county experiment stations are a failure, and will be until this society has some resources. Now, the working resources of this society is from \$150 to \$200 a year. If we could have a society with a membership of one thousand the influence it would give us would bring us any amount of appropriations we wanted, then we could establish experiment stations in the state, and see that the man who was running them accomplished something.

Mrs. Kennedy. I would like to ask if it is fair to say that Minnesota is not a fruit growing state, when it is just because we are so ignorant that we don't know how to raise it? I say take money and put it into a map, and show that apples can be raised here, and diffuse it all over the prairie and we will raise apples. (Applause.)

President Elliot. In regard to what friend Pearce says, in speaking of experiment stations, he wasn't here last night, and didn't hear what I had to say in regard to them. Our experiment work has been done heretofore voluntarily; there has been no one held responsible for that work, none to overlook it, and no one ever felt called upon to report to anyone, even to the State Horticultural Society. From work of that class, we are not receiving the amount of experiment knowledge we should, and we never will have any better until we get the number down to about eight stations, judiciously located, having regard to what we want to experiment with. I would not experiment with Duchess apples away up in the light part of that map; I think that would be foolhardy; it would be time thrown away; but we can locate two stations in the lower part; one in a favorable, and one in an unfavorable place. We can pick out the worst location we can find for the crab apples and also the most favorable location, and see what kinds we can grow; and then take our small fruits and see what can be developed up in the north part. They tell us that strawberries, raspberries, black currants and gooseberries, grow in Manitoba. If that is so,

we are going to grow small fruits all over Minnesota. It is that kind of information that we want to get at a glance. There are a great many people in this state who, if you send them a report, will put it away on a shelf, but if there is a map in it they will begin to inquire in regard to it, and so they get it as a sort of object lesson. They get to thinking about it, and in that way we are going to get them interested in our work, and that is the only way I can see that we are going to attract the attention of the masses. I am heartily in favor of the map, even if I did originate the scheme and I hope I shall have backing enough to carry it out.

Mr. Pearce. Mr. President, one word. Now, while Mr. Elliot is rather down on experiment stations we have a great many of them all over the state; we have ten times as many as you have any idea of. I believe I have got every valuable Russian there is, I have every new variety and I have seedlings that you never heard of. I have sent out all over Dakota and Minnesota those varieties and am getting reports from them every year; I have them up in Manitoba. There is an experiment station there. If we had thirty-five or forty of those stations over the state they would do more good than any map you can print.

Mr. Harris. What good does what you know do the general public unless you make it known to them.

President Elliot. We don't get any information from what you know and you are just in the same position as the man that put his candle under a bushel. Now what we want is information and that is why we are pitching this at you and everybody else that doesn't give us a report.

Mr. Pearce. I made a full report last year but it was accidentally lost.

Mr. Harris offered the following resolution, which was adopted:

Resolved, That this society approve of the suggestion of President Elliot to publish in our transactions a map of Minnesota showing in colors the original forest and prairie, the highest and lowest altitude, geological formation etc, and also the districts or most northern limits where the Duchess apple has been successfully fruited, also the Transcendant crab, the grape districts and small fruits, and that the President and Prof. Green are delegated to prosecute the work, subject to the approval of the executive committee.

The meeting adjourned until two o'clock P. M.

WEDNESDAY AFTERNOON SESSION.

The meeting was called to order at 2 o'clock by President Elliott. The Secretary read a paper from Mr. Duffus, descriptive of his orchard, as follows:

SUCCESSFUL ORCHARDING.

By William Duffus, of Lake City, Minn.

My orchard consists of about one hundred and fifty trees of Duchess, Wealthy, Minnesota, Tetofski, Orange, Early Strawberry, Transcendent, Hyslop, and other kinds of crabs. It is located on a high, nearly level prairie, sloping a little to the north. On the north and west sides, is an oak grove; on the east, a row of poplars, and a few scattering soft maples on the south. The soil is a clay with a little black loam on top, and a clay sub-soil.

Some of the trees in the orchard were planted fourteen, and some eighteen years ago. I cultivated them till about eight years ago and then seeded the orchard down, and have since used it for a calf pasture.

Since the orchard commenced to bear I have never failed of having a good crop, although, of course, some years a better one than others. Last year the yield was larger than I ever had before, gathering two barrels of Wealthy, twenty-five barrels of Minnesota, (and not an unsound one in the lot), and more Duchess than I knew what to do with.

I sold over \$100 worth from my orchard besides what we used and gave away. I have Duchess trees that bore eight barrels apiece this year, and had to cull them out, to keep the limbs from breaking. They hung down like weeping willows.

The wind does not blow my apples off much, and the codling moth does not trouble them. I have never seen sounder apples than I grow.

Of the varieties I have tried, I would plant Duchess, Minnesota, Orange, Early Strawberry, Tetofsky and a few Wealthy. The Wealthy is the best apple I grow, but the trees do not stand so well as the rest. I also had three or four barrels of Tetofsky.

DISCUSSION.

Mr. Thiellman. I live about five miles from Mr. Duffus. He has a very nice orchard on land that inclines to the north. It is protected partly by oak and partly by poplar and one thing or another. He has raised quite a large quantity of apples, and has been more successful than any one in that part of the country. The soil is clay loam. He has never had any hogs in his orchard that I know of.

I wish to have that hog question discussed more fully whenever we have time.

Prof. Green. Does he put any mulch around his trees?

Mr. Thiellman. I have never seen him.

A member. Is it seeded down in grass?

Mr. Thiellman. Yes.

Dr. Perkins. How many calves does he keep in his orchard?

Mr. Thiellman. He has probably four or five in there.

A member. Is it clover or timothy?

Mr. Thiellman. It is mixed.

A paper on native plums was then read by Mr. Harris.

NATIVE PLUMS IN 1889.

By J. S. Harris, La Crescent, Minn.

Mr. President and Members of the Minnesota State Horticultural Society:

Peaches, cherries and tame plums are fruits which at present cannot be successfully grown in any part of this state. Many varieties of the plum have been given a fair test, but all have proved to be too uncertain to warrant us in giving them further trial. Considerable quantities of them find their way to our markets from California and the South, and often peaches are offered in quantities in excess of the demand, but the prices at which they are sold place them beyond the reach of the masses for every day use in their season, and as they have to be picked and shipped before fully ripe the quality is generally poor and many of them are not fit to eat. At best they are a costly luxury, and it is no wonder that our horticulturists are looking about to find something to take their place, and at the same time keep our money at home. The best substitute that offers is the native plum (*Prunus Canadensis*). This is found growing wild in a great number of varieties over a considerable portion of this state and further north in Dakota and Manitoba, which fact removes every doubt of its hardiness and adaptation. The quality of some of them is excellent and a careful selection of varieties might be made that would cover a period of two months from August 1st to October 1st. I do not claim that they would be a perfect substitute for good peaches and tame plums, but I do claim that some varieties of them are better for eating from the hand, equally good for canning and cooking, and more wholesome than the unripe or half decayed imported peaches and plums exposed for sale in our markets at the same season of the year.

Our once beautiful wild Plum groves are rapidly disappearing from uprooting to make way for cultivated fields, or from being thrown into pasture lands, so that in some seasons there is a scarcity of the fruit which has started a demand for trees of the best varieties for cultivation beyond the ability of nurserymen to supply.

I believe we cannot too soon make a canvas of the state for seeking out varieties and testing them to learn which are best, so that our markets may soon be supplied with the home grown fruit at an annual saving to the people of more money than it would cost to run this State Horticultural society twenty-five years, and also save the farmers, the vexation of grubbing out worthless

varieties to make room for better. The crop of this fruit the past season was in many localities greater than the average, but usually the fruit was below the average in size and quality. This was occasioned by over-bearing, extreme drouth and the presence of an unusual number of aphides preying upon the foliage and tender twigs.

The design of this paper is to describe and make a few comments upon varieties, we have had an opportunity to examine or test. At the Winona Fair, held during the last week in August, some 15 or 20 varieties, generally of large size and fine appearance, were exhibited by O. M. Lord, of Minnesota City; J. C. Kramer, of La Crescent; Mr. Harrison, of Homer Ridge and others. But 4 or 5 of the varieties were ripe enough to be at their best. They were the Cheney, Rollingsstone, Harvest, Gaylord's Favorite etc. At the Southern Minnesota Fair, held at Rochester, during the first week in September, a still larger exhibit was made by Sias, Dartt, Kramer and others, fine in appearance, but I was obliged to leave before the close of the fair and did not have an opportunity to give them a critical examination. At the State Fair one week later over 50 distinct varieties were shown and probably ten or a dozen of them will prove worthy of cultivation. The largest plum of any variety was one named the *New Ulm*, a seedling grown by C. W. H. Heideman, of New Ulm, Minn. Mr. H. says this plum was raised from seed of a wild variety growing in that vicinity. The tree is six years old and fruited heavily the 4th, 5th and 6th years. It is described as being vigorous, hardy, and healthy, irregular in form, having no well defined upright leader. Wood not thorny and leaf large and thick. The specimens shown were the largest natives I have seen, measuring from 2 to 2 $\frac{1}{4}$ inches in length and 1 $\frac{1}{2}$ to 1 $\frac{3}{4}$ in diameter, being oval in form. The color was a deep mottled red. Skin thin and tender, flesh of fairly good consistency, flavor excellent for eating from the hand, and I should judge it would cook well. The owner states that they ripen usually from August 25th to September 1st, and that the specimens exhibited were selected after the bulk of the crop had been taken off.

The next largest variety that has come to my notice is the Cheney, a large, nearly round, smooth skinned, bright red plum, of good quality, and excellent for cooking and canning. The tree is a vigorous upright grower and bears fruit at the age of 3 or 4 years. The fruit ripens from August 20th to 25th. It is a very distinct type of the native plum and was first brought to notice by E. Markel, of La Cross, Wis. The fruit when cooked, is free from astringency. Well developed specimens this year, measured 1 $\frac{1}{2}$ inches in diameter. The Rollingsstone, from O. N. Lord, is a medium large, round, purplish red variety; season from 1st to 10th of September, skin thin and when the fruit is fully ripe peels off readily, leaving the flesh in a shaply mass. It is sweet and fine flavored and its consistency makes it a good table fruit. The De Sotos exhibited were large and fine. This variety is excellent for eating and cooking, season from September 10th to 20th. The tree is hardy and vigorous and it has become popu-

lar as an early, sure abundant fruiter. The demand for the trees greatly exceeds the supply. The Rockford plum, shown by C. G. Patten of Iowa, was a splendid fruit. Size large medium, color purple, covered with white bloom, skin thin, peels from the flesh when ripe, pulp firm, sweet, rich, fine flavor. Mr. Wilcox, of Hastings, showed one variety. Size large, form oval, color yellow with soft carmine cheek, skin thin, peels from the flesh when fully ripe, flesh medium consistency, sweet and good flavor. Gen'l Le Duc, ex-commissioner of agriculture, sent me three varieties for examination. No. 1, size large, color rich golden, with crimson cheek, skin thick, pulp rather soft, sweet and fine flavor. No. 2, medium large, deep red thickly dotted with small white specks and covered with a whitish bloom; skin thin, tasteless and parts from the flesh, flesh deep yellow, consistency medium, flavor good. No. 3, small, yellow changing to red, very good to eat from the hand. He has another variety named Vermillion, of large medium size, that is one of the most beautiful and excellent varieties I have seen. Season earlier than the above. On the 17th of September I recieved a package by mail containing three varieties from Miss Morrison, of Rosemount, Minn. No. 1, was large medium, dark red, thin skinned, meaty fruit of that class, usually designated as peach plum. No. 2, is a large plum also red in color, skin thick and acrid; flavor of pulp good. No. 3, is a large late plum, color a yellowish green, skin thick, quality fair. I kept some of them two weeks in good condition and my impression of the variety is that it will be of great value, as a starting point to secure a late good keeping and shipping variety. A note accompanying them, stated that Nos. 1 and 2 were the last remaining specimens of the crop which was at its best a week earlier and that they did not show the real excellence of the varieties, while a frost had occurred the night previous to the picking of No. 3, which may have lowered it in flavor and keeping qualities.

EMERSON PLUM.

Mr. Kramer, of La Crescent, furnished me samples of this plum about the 25th of September. The fruit is large, nearly round, color red, skin thickly dotted with small gray spots. It is firm enough for paring, and is equal to peaches for canning and preserving, and I think will ship well. It originated near Dubuque, Iowa, and has not been tested farther north than Houston county, where it is succeeding well and is a regular and abundant bearer.

Oct. 6th I received some plums from Mr. H. Becker, Winona county, supposed to be seedlings from the Miner. Fruit large, round-ovate, color deep red, dotted with white, skin thick, flesh firm, with a sweet peachy flavor. Trees not old enough to prove their hardiness.

Mr. H. Knudson, of Springfield, Minn., has sent me by mail at different times eleven varieties that he has selected from the groves in his neighborhood and has under cultivation. As a whole the collection is excellent, and covers a period of five or six weeks.

The first received is named Harvest plum. Size large, form

round ovate, color red, skin thin, quality fairly good. Season 15th to 20th of August. Valuable on account of earliness. Aug. 24th he sent me samples of the Meadow plum and Marble plum. They were delayed in the mail and arrived in poor order. They are of full medium size and of fine appearance. About Sept. 1st I received samples of the Peach and Homestead plums. These were without exception the finest dessert plums that have come to my notice. The Peach plum is large, nearly round, color deep red, the skin is thin and peels from the flesh, which is of good consistency, sweet and rich, the stone is nearly round and free. The Homestead plum is of medium size, round, deep red, covered with a whitish bloom, the skin peels off easily leaving the pulp in good shape, the flavor is rich and peachy, pit small and free.

The Hillside plum is medium in size, deep red in color, skin thick and somewhat acid.

Canary, small, yellow, juicy and sweet.

Bean plum, large, rich golden yellow with soft blush on sun side and covered with white bloom, form oval, pulp soft, flavor rich and good.

Violet plum, large medium, color violet red, form round oval, skin thick, pulp medium firm, and sweet; a free stone variety.

City plum, a seedling, very large, nearly round, skin thick, pulp soft, flavor subacid, good. Season 15th of September.

The Gaylord plum, shown in Mr. Lord's exhibit, at the Winona fair, is of Northern Iowa origin. The fruit is very large, form oval, ground color yellow with red cheek on sun side; is a clingstone variety, pit small for size of fruit; begins to ripen about Aug. 20th and continues for some time.

The Forest Garden, Weaver, and several other varieties are growing in this state, but have not fruited with me yet. I hope to be able to report upon them at some future meeting.

The more I see of this valuable fruit the more am I impressed with its usefulness, and as I have frequently said to you, I believe that no time should be lost before steps are taken to ascertain its possibility for improvement through selection and hybridization.

J. S. HARRIS.

DISCUSSION.

Mrs. Bonneville. I would like to know if mulching would do the wild plum trees any good after they have been set out?

Mr. Harris. Mr. Lord's experience is, that taking the wild plum tree right from the forest and putting it in the garden where the ground has been manured for other crops, improves it a good deal in size and also fruit. Mr. Lord thinks that mulching and manuring would be beneficial. Perhaps it would be well to state, while I am on the floor, that it has been the experience and observation of many people of late years that this fruit bears better if you have more than one variety together. If you set more than one variety in the rows, the blossoms seemed to be fertilized better and they produce more fruit.

Mr. Thiellman. I have one plum tree on my place that is far ahead of anything else I have ever seen. I like it so well that I took some of the sprouts up and transplanted them into cultivated land. I have also set grafted trees of this variety in the garden, in the very best spot I have on the place, and find that none of them either from sprouts or when grafted are as good as the original tree; that is, the plums are not so large or so fine. To explain that part, I would say that there is a little stream running near the original tree.

Mrs. Bonneville. Did you trim that tree?

Mr. Thiellman. No.

Mr. Burnett. I had some Minnesota Plums and was troubled with the aphid; so much so that a great many of the trees lost their leaves. Can you give me any idea as to how I can remedy this evil?

Mr. Harris. They are now using kerosene emulsions for destroying insects upon trees. I cannot give you the formula for that emulsion but it is kerosene mixed with soap and diluted with water and the trees are sprayed with it. We tried another experiment in our region this year. There was a man around there with some kind of preparation, which was said to be sure death to any kind of insect life. A teaspoonful of the preparation in a quart of water was the right amount to apply to trees for the aphid. I saw that applied in La Crosse. I tried it on apple trees on my place and it seemed to be beneficial. It is something that is sold as sheep clip.

Prof. Green. The Hubbard formula is the best one for making kerosene emulsion. It is composed as follows:

Kerosene, 2 gallons.....	67	per cent.
Common soap or whale oil soap, $\frac{1}{2}$ pound,.....	33	" "
Water 1 gallon.....	{	

"Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute before using one part of the emulsion with nine parts of water. The above formula gives three gallons of emulsion and makes, when diluted thirty gallons of wash."

I want to ask Mr. Harris why he thinks that plum of Mr. Patton's is a hybrid?

Mr. Harris. In regard to the Rockford plum I presume Mr. Gaylord knows more about it than I do.

Mr. Gaylord. Mr. Green is the proper originator of that plum.

I went to him two or three years ago to see that plum; but it was a day or two after he had finished picking them. He said to me "I wish you were in here before because I know you have some experience with those plums and I just wanted you to see them." He said he got them over in the woods. It is a dark colored plum of medium size and a little bluish. This Rockford plum is among the best of our native plums as to quality and growth of tree. I have them growing on my own place.

President Elliot. That is, the bloom is bluish, but not the skin.

Mr. Gaylord. The bloom is what gives the color, not the skin. I think the skin is inclined to look a little bluish.

Mr. Cutler. I would like to ask Mr. Harris what he considers the best plums, of those that are now disseminated over the country?

Mr. Harris. Well, I would put the De Sota first and the De Sota second.

The following paper was then read:

THE FUTURE OF GRAPE CULTURE AT LAKE MINNETONKA.

A. W. Latham, Excelsior, Minn.

When this subject was suggested, it was the intention to include the grape growing interest over the entire state, but upon reflection it seemed best to limit it to the region about Lake Minnetonka, with which the writer is more familiar. The conditions are quite similar in many other localities in the state,—in the neighborhood of its larger lakes and along the bluffs of its rivers, and what is said here, will apply in the main to them, excepting perhaps the condition of neighborhood to a large local market.

That there may be a "future of grape culture" at Minnetonka as a successful industry, three conditions are absolutely necessary, viz:

First. That varieties of grapes which the public demand or for which a demand can be created, can be matured in large quantities.

Second. That there be a large market for these grapes.

Third. That they can be put upon this market in competition with the same or similar varieties grown in other states, and yield a fair profit to the grower.

As to the first of the conditions, while a large number of varieties of grapes have been grown and ripened at Minnetonka, as in other favorable places in the state, during the past quarter of a century, the business as such has not yet assumed such proportions

and stability that it can fairly be denominated an established industry. Some facts connected with it however have been well established, to which attention is called.

Varieties not later in ripening than the Concord are matured in favorable locations about Lake Minnetonka with the same degree of certainty as any other horticultural product. In twenty years experience not a single crop has been a total loss, and on four seasons only, have there been partial losses that could be ascribed to the climate. These losses have been confined in the main to the later ripening sorts overtaken by the early fall frosts of unusually cold and backward seasons. These four unfavorable seasons include only one late spring frost injurious to the grape buds.

Minnetonka grapes in bunch and berry are longer and their general appearance handsomer than the same varieties, grown in states to the East and South. This is the testimony of horticulturists from abroad who have visited the Minnetonka vineyards or seen the fruit on exhibition at various fairs throughout the country, where as a rule they receive the highest awards.

The flavor of properly ripened Minnetonka grapes is rare eating. They lack in a degree the sweetness of eastern grapes of which one sooner tires, but hold in its stead a raciness of flavor that is the equivalent of the ozone in our glorious Minnesota air. They are juicy and tender, quite fine on the stem and fairly good keepers and shippers.

The kinds that can be successfully ripened here, leaving out the Catawba, are those to which the appetite of the American public is trained.

The area of land that may be defined as favorable to grape culture about Lake Minnetonka, in number of acres, is very large, and may be estimated by the thousand. While for the earlier plantings very high places, with well protected southern exposure, were selected as absolutely necessary to success, later plantings, on almost all slopes and under a variety of conditions, have demonstrated that the area of safe grape culture is much larger than has been supposed. In illustration of this it may be stated that the vineyard from which the fruit has been gathered that has taken a large proportion of the first premiums on grapes in the northwest during the past twelve years, is located upon high ground on an exact northeast slope.

Minnetonka vines are good bearers and may be counted upon with reasonable certainty for a fair annual yield. Being regularly buried they are exempt from the danger of freezing which occasionally cuts off an entire crop in other states. If in any year the yield is poor it is more than likely the result of unskillful handling.

Minnetonka vines are largely exempt from the attacks of insects and from all diseases except the downy mildew. In one or two years of unusual moisture, accompanied by weather favorable to its development, this disease has done serious harm to the Delaware grape, and in a less degree to several other varieties which are grown only in small quantities. There is good reason to believe that an effective remedy has been found for this disease in an ap-

plication to the vines of a solution containing sulphate of copper. Experiments carried on in many parts of the country almost uniformly report its successful control. There was no opportunity to test it at Minnetonka the past season as the dry weather gave entire exemption from mildew,

The second necessary condition for a "future of grape culture" at Minnetonka is a market for the product. The close proximity of two cities with nearly half a million mouths to feed affords one of the best local markets in the country, and behind and beyond these cities stretch the plains and prairies of the almost boundless empire of the Northwest. The region about Lake Minnetonka is evidently the outpost of vine culture in this direction, the last vantage ground that can be profitably occupied. It is in point of distance nearest to, in fact on the very border of this immense territory which, though not friendly to the vine, is the home of a great population soon to be numbered by millions.

It has been roughly estimated that in 1889 two hundred and fifty car loads of grapes, not including shipments from California, were received and handled in the two cities. Assuming 2,500 baskets to the car-load and eight lbs. net per basket, 250 car-loads would amount to 5,000,000 lbs. Assuming that vineyards will bear an average of 10 lbs. per vine, to produce the amount would require 500,000 vines, which, as ordinarily planted, would occupy approximately 800 acres.

Evidently the grapes now grown about the Lake, or in the entire state, cut a very small figure in this great market, and this demand can be depended upon to increase faster than the increase of population.

It is, then, plainly not a question whether consumers can be found for the grapes, nor indeed whether they can be grown at Minnetonka in sufficient quantity, but rather, can they be produced at such a cost that when sold in the open market in competition with grapes raised in other states, under a milder climate, they will afford a reasonable profit to the grower!

This brings up the last, and just now, the most interesting and most important of the three necessary conditions for a "future of grape culture" at Minnetonka.

The states that furnish grapes in the market, in competition with Minnetonka grapes, are California, Iowa, Missouri, Illinois, Ohio, and western New York. Grapes grown in states south of these named, ripen too early to be competitors. The quantity and price of California grapes have had, in the past, a serious effect on the prices of Minnetonka grapes, but the basis of prices now reached make it improbable that they will hereafter be a large factor in regulating prices on account of the high freight charges they necessarily incur. Missouri and Illinois put the bulk of their crop of Concords on the market before the Minnetonkas are fairly ripe, and most of those from Iowa are offered a little later. The crop of Ohio appears at about the same time as the home crop, and western New York sends hers a little later, and furnishes the Concords that are found in the market till mid-winter. The plenty or

scarcity of other fruits contemporaneous with Minnetonka grapes, has an effect upon prices, but in the long run they balance up about even, and their presence in the market aids in creating a great fruit distributing center, and in this respect is a benefit.

A comparison as to quality and condition when marketed shows that grapes from Missouri, Illinois and Iowa seldom come into this market in first class shape. This fruit although sweet and good when newly gathered, is full of juice and of rather tender skin, and breaks easily in handling. Ripening as it does early in the season while the weather in those localities is still warm, it reaches this market as a rule in a more or less damaged condition.

The Concords of Ohio come later in cooler weather, and being a firmer berry, they reach here in a better condition than from the states above named, but never heretofore in sufficient quantity to seriously affect the market.

While these states were the only competitors sending grapes to this market the Minnetonka grower had little to fear.

In western New York in the angle formed by Lakes Erie and Ontario, protected and nourished by the moist air of both lakes, lies a territory which is apparently the natural home of the Concord grape. The culture of the vine there has become a great industry. Its Concords are different from any raised in the west. The bunches are of medium size and fairly compact and the berries of good size; sweet, with a firm skin and adhering closely to the stem. Altogether it is a fruit possessing the qualifications needed for safe handling and long keeping.

This is a fair description of the New York Concord that three years ago appeared upon this market in great quantities for the first time and following the channels of trade north and west were diffused over the whole country as in a flood, and filled the market. This overflow from New York has been repeated annually since and may be looked for regularly hereafter.

These grapes reach this market in much better condition than those from the south, but not always in first class order. A fair proportion are injured by crushing, heat, mildew and other disasters to which fruit is liable and the consumer can not be sure that his baskets contain only sound and uninjured grapes.

The grapes of Minnetonka, sold in competition with this southern and eastern fruit, if properly gathered, when fully ripe, and carefully handled, is placed on the market in a uniformly sound and fresh condition.

Can the Minnetonka grower raise and market the grape as cheaply as the grower of Missouri, Illinois or New York? There being no material difference so far as can be learned in the cost of labor required in the different localities, in the yield per vine, in the cost of materials used or in the commission paid to the agent who sells the fruit, in what respect is the Minnetonka grower at a disadvantage? The only extra labor required here is the burying of the vines, which should not exceed in cost one cent per vine. But this extra labor practically insures a crop the year following, and vine growers in most of the localities referred to would doubtless

find it profitable to bury their vineyards. As several times an offset to this extra labor is the difference between the cost of transportation a few miles and hundreds of miles. The Minnetonka grower has another decided advantage over any grower at a distance in not being under the necessity of entrusting the sale of his product unreservedly to another. He is in a position to know that he is receiving right treatment and the full market value of his crop.

The appearance of the New York grapes in this market and the consequent decline in prices, was a sore trial to the Minnetonka grower. But after all, thousands were benefited while a few only were injured. The home grower could not for many years have begun to supply the market, and such a decline in prices to what the mass of consumers could and would pay had to come at last.

The present aspect of the business shows no real cause for discouragement, to the Minnetonka grower. Grapes can be raised at Minnetonka as cheaply as in New York, freight charges are several cuts less per basket, the fruit will go to market in a uniformly fresh condition, its appearance, quality, etc., are all that can be desired and here is the very threshold of one of the best markets of America,

Dealers who represent the best retail trade in the two cities buy Minnetonka grapes of brands that are known to be gathered ripe, and carefully handled, at a price much above that asked for the best eastern grapes, for the reason that their customers prefer the quality and they avoid the loss that attends the uncertainty of condition of all foreign grapes. As Minnetonka grapes are produced in greater quantity, this demand will continue on a larger scale, with less difference in price, until eventually when the home grown supply reaches in full the public demand, the eastern grapes will be practically driven from the market, during the Minnetonka grape season. Being a somewhat better keeper, the New York Concords will likely follow the Minnetonkas in the market, extending the season beyond the present limit of home grown grapes.

Two features of grape culture at Minnetonka make it improbable that this region will ever contain large vineyards of hundreds of acres, as do most localities where vines are cultivated as a business. The absolute necessity of having the vines pruned and buried before the freezing of the ground, interferences with the setting of larger areas than one can prune or get pruned by a competent person before that time. Experience shows that to be uniformly safe the vines must be buried by November 1st, and as they are seldom ready for pruning much before the middle of October, the time is very short for this labor and the number that can be handled necessarily very limited,

And again large tracts all of which are safely adapted to vine culture are not often found. But nearly every place of five, ten or twenty acres, located within the Lake Minnetonka region will be found to contain more or less land suited to this purpose, and a part of every such place should be devoted to it.

These features of the business are very advantageous to the development of this favored region. The owner of a small tract who

will diversify his occupation by various horticultural pursuits, including poultry, and perhaps bees, planting as large an area of grapes as his place will permit, or the shortness of the fall season will allow him to bury, establishes for himself an ideal home, upon which he and his family will find pleasant employment and good returns for their labor.

In conclusion, a comprehensive view of the present condition of grape growing at Lake Minnetonka leads logically to the conclusion that it has a great future. Disappointments from bad culture, poor locations, wrong varieties, and unwelcome competition are but the finger-boards that point the way to success. The culture of the vine is to become a great industry at Lake Minnetonka at no distant day and an important source of income to thousands of people who will occupy pleasant suburban homes around its shores.

New varieties, and new methods of culture, and training better adapted to the peculiar circumstances will prevail; new and better methods of getting the fruit to market, and distributing it over the two cities and the great Northwest, will take the place of the present expensive and unsatisfactory ways, and what is now a small business without order or system, will develop into a great and well organized industry, from which all engaged will reap reward.

DISCUSSION.

Mr. Harris. Mr. President, you set me about other business while that paper was being read, so I didn't get the drift of it. But I wish to remark that there are a great many portions of Minnesota that are probably fully equal to the region around Minnetonka for grape growing, and I believe we can grow grapes in Minnesota just as cheaply as they can in the State of New York, when we understand how. If there is any greater expense, it is the bare expense of laying the vines down in the fall. The same commendations have been received for my grapes as for your grapes in this part.

Grape culture is one of the branches of horticulture that our society should foster; and it is one of the branches that will be greatly benefitted when we get that map perfected. There is another region extending all the way from Excelsior down the Mississippi valley, probably to the very state line of Iowa, where grapes may be successfully grown. Out in Martin county around some of those lakes, they are making quite a success of it, and up in the neighborhood of where Mr. Peterson lives, they can grow fine Concord grapes. Minnesota, therefore, can grow her own grapes, and it is the duty of this society to press the matter. Most of us who are in Minnesota today, came here to stay. We are unlike the settlers in most new countries who come and make a short stop until they can sell out, and leave for some better place.

We came here to spend our days, and it should be our highest ambition to build up our state and develop its resources and give it a name that shall be equal to, if not above that of any state of our Union. I like what I heard of that paper, and I hope next year we will get another paper supplementing it, which will give an idea of the grapes that are grown in other parts of the State.

Mr. Pearce. I think the grape question is a great question for Minnesota. I doubt very much whether there is a State in the Union possessing a location so well adapted to the growing of grapes. I have traveled up and down Minnesota and it occurs to me that a grape crop would be a sure thing. Take the bluffs of the Mississippi, in Houston County, and all through there. I don't think there ever was a better grape country on the face of the earth. We have the advantage of clear weather, bright sunshine; and we can raise grapes with the finest bloom. There are no grapes that go into any market having bloom like the Minnesota grapes. This is owing to our bright sun. Follow the Mississippi river to the Iowa line and you have a grape country all the way, and also around all the large lakes. I have received almost a hundred letters from men, who have experimented around the large lakes in Minnesota, saying that they are making a success of it. It is an interest that is now in its infancy. Minnetonka is a good place to grow grapes, but the grape soil around Minnetonka is limited. There are localities around Minnetonka where they will always raise grapes and will be sure of a crop.

Dr. Frisselle. I would like to ask Mr. Latham if he will state the varieties that are best adapted to cultivation in this state, and around this lake; and the kind of soil, which, as a rule, is best adapted to the grapes that are cultivated here.

Mr. Latham. The growers around here, of course, all know that the best grape for market is the Concord. Besides that, the grapes that are asked for in the market are practically all grown here. The Delaware ranks next to the Concord, and the Rogers No. 9, No. 44 and No. 3 are safe to plant. They are liable to mildew a little, but that is easy to control; I think them grapes that are very nice indeed and they ripen very early. The Worden has some faults. I should never plant largely of it here; perhaps in some places it might be different. My experience has been that a great many of the buds don't develop in the spring, and then there are other objections that I will not state now.

Dr. Frisselle. How about the Brighton?

Mr. Latham. It is one of the first. It ripens early enough too, but it ripens very unevenly on the bunch, about Lake Minnetonka.

Portions of the bunch will be ripe when the rest is quite green. That is an objection to the Brighton. Moore's Early is quite like the Concord. It has a nutty flavor to me. I like it as well as the Concord but it is a poor bearer. If it would bear like the Concord it would drive almost everything else out of the market.

A voice. For the benefit of outsiders I would like to hear something in regard to the Iona.

Mr. Latham. In what respect?

A voice. The ripening in this state, whether it is profitable?

Mr. Latham. To raise the Iona here it is necessary to have an unusually favorable place, because it is a late grape. It is the latest grape we raise here. If you have a place that is very high, and the soil is just adapted to the grape, and it is reasonably protected from the wind, it does very well.

Mr. Peterson. I would like to know if stable manure would have any effect upon grapes.

Mr. Latham. I have never used it to any extent.

Mr. Peterson. I only use wood ashes now.

Mr. Latham. The soil here in the Big Woods unless it has been used for a great many years does not need any fertilizing for our grapes. The vineyard back of my house has been planted some fifteen years and I don't see that it needs a fertilizer now, any more than when I set it out.

Mr. Wilcox. How close do you plant?

Mr. Latham. My last vineyard I planted seven feet each way.

Mr. Wilcox. How deep do you set vines when you set them out?

Mr. Latham. I plant deeper than most planters with the idea that the roots go down to the clay.

REPORT OF THE COMMITTEE ON FORESTRY LEGISLATION.

The committee appointed by President Elliot made the following report, which was adopted:

WHEREAS, Forestry is an essential branch of horticulture, without which no permanent progress is attainable in fruit, field and garden productions, and

WHEREAS, The devastations of our native forests must, as in other parts of the world where this curse falls, transform our naturally rich lands into desert conditions, by drying up our springs and depleting our lakes and rivers to the injury of navigation and all other industries, and

WHEREAS, The provisions of the timber culture act have proved

impracticable, not being wisely defined and enforced, making failures the rule and successes the exception; therefore, by the Minnesota Horticultural Society be it resolved

First—That forestry be nationalized, and classified with agricultural, horticultural and waterways improvements.

Second—That Congress make an adequate appropriation for the above purpose, and for greater encouragement to settlers, including the merits of the work, for the growing of forest trees on their farms.

Third—That Congress appoint a board of forest commissioners, representing different states, whose duty shall be to protect and preserve such native forests as they deem necessary for the general welfare, and see that valuable and hardy trees are raised under their supervision on government lands around our lake and river sources, and over and around our barren hills, mountains and desolate places, and wherever else in their practical judgment they are needed to mitigate the rigors of extreme heat and cold, and to protect our crops, stock and homes against the hyperborean and simoon winds and storms, to which our prairie country is now exposed.

Fourth—That our society respectfully invite all our sister horticultural societies in the United States to co-operate in this important enterprise.

Fifth—That printed copies of this preamble, with the resolutions, be sent by our secretary to all the congressional members of Minnesota and the Dakotas, with letters asking them to lay the claims of this movement before Congress without delay.

J. O. BARRETT,	} Committee.
S. H. FOLSOM,	
F. F. GRIMES,	

Mr. Dartt. Mr. Chairman, it seems to me it is not best to declare the Timber Culture Act a failure. If it is not just what we would like to have it, why, it is better than nothing. Now, my theory is to keep all that we have, that is good, and get as much more as we can; and for that reason I would like to see that objection to the Timber Culture Act stricken out and then go on.

President Elliot. I think Mr. Dartt must be out of his head, for I never knew him to come up here and propose anything of that kind in that way. He has always taken a different view of every failure, especially in regard to the apple. I think there must be something going to happen. He has always considered the Wealthy a failure, while the rest of us were willing to hold on to it even if it were a failure.

Mr. Grimes. I think Mr. Dartt misunderstands the views of the committee that framed those resolutions. We do not suppose, or intend that congress should repeal the present law without substituting something better.

Mr. Dartt. Isn't what we have better than nothing?

Mr. Folsom said that he would like to champion a timber culture law. He thought that *the* law in its practical workings was a failure. It was designed to give forty acres for timber purposes but it was cut down to ten acres. He referred to the provisions of the act in force, claiming that its provisions were such as to make it practically a failure. It was very seldom that ten acres of good thrifty trees could be found on any tree claim, whereas it was contemplated that ten acres of trees would be growing on every timber claim. The timber culture act was a failure, because it gave speculators a chance to secure the public lands without becoming actual settlers. He had seen instances where parties had gone on the prairie and taken up claims, and made a mere pretence of carrying out the provisions of the law. They took the claims for speculative purposes, and not for the benefit of the farm. Some of the best lands in Minnesota and Dakota had gone into the hands of speculators in this way. He insisted the law was a failure. In one sense it would be the salvation of Dakota, Nebraska and Kansas, as well as the western portion of this state, if trees could be grown as they should be. He had been through this treeless portion of the country. These hot currents of air are often very destructive to growing crops, especially to grass, corn and wheat. The electrical influence exerted at times was something remarkable. He didn't pretend to be a philosopher, but he believed that when the country lost its timber its doom was sealed, and it would become as barren a waste as some countries we read about.

He didn't work for reputation or glory in championing a cause of this kind; he had always been interested in it. He said some of his friends who had known him intimately many years had known of the efforts he had made to get various societies interested in this subject. He had not heard whether the forestry association was in existence, for several years. He had been raising trees himself on his own claim, and when they failed he felt he was too old to make another effort. He hoped the Horticultural Society would be able to accomplish something in awakening a deeper interest in this matter. He was satisfied that it was almost impossible to raise small fruits in this western country without trees and forest protection. One-fourth of the country should be devoted to forestry in order to guarantee success in horticultural pursuits.

Mr. Barrett. I represent the prairie country. I know all about these terrible winds that have been alluded to. As has been stated we do not ask the repeal of the present law. If congress should

repeal the timber culture act and do nothing more, I should deplore it. We do not intrench upon that law; but we simply want to extend the movement of forestry on a more extensive scale, to cover the country at large. Let us plant ourselves squarely upon a position, and let us determine that we shall accomplish something in the grand march of expansion and advancement.

President Elliott. Now, Mr. Dartt, I have been keeping track of this forestry question for a year or two, and there is a wide spread feeling throughout our country in regard to this same question of forestry. People are beginning to believe that our present supply of timber is not inexhaustible; they know that in a few years we shall be without timber, unless something is done to stop this devastation by fire and this cutting down of everything. We have come down to something that will bring back those broad acres into forests again. The question is, how are we going to do it? We must do it by agitation. It is not going to be done by this society, nor by any other society; it is to be done by every one lifting a light breeze when he can. We can write to our congressmen and representatives and tell them our wishes, and in that way we will have some influence on their vote. If there is any one state in this union that has need of forestry protection it is Minnesota. I haven't at my finger's end the figures in regard to the number of acres that are burned over of our fine country every year, but it is something immense, and that is one cause of our loss of timber. Fire runs through it, and unless it is cut the same year or the next year, it is useless; and it is only this kind of agitation that is going to bring people to their senses. We have quite a number men in congress that are interested in this direction. It is by educating the people that we must do a large proportion of this work, and we have to get at it in an economic way. The Vanderbilts are putting out a large tract of country in Georgia or South Carolina, and Robert Douglas has the contract for planting two thousand acres of evergreen trees there, in the next two years. And so the thing is only beginning, and if we can do anything to help this work along it is our duty to do it.

Mr. Dartt. I move that the clause be stricken out.

The resolutions brought in by the Forestry Committee were then voted upon and adopted.

The discussion on grapes was then resumed.

Mr. Latham. I was at Mr. Robertson's place when his grapes were ripe, and tried the fruit. I made a collection over there which went into my special collection at the State Fair. They have one variety, I think the Poughkeepsie Red, that is a cross

between the Delaware and some other grape. Mr. Robertson called my attention to it especially, a year ago last fall. We had a great deal of mildew about here then, and the Delawares in his vineyard were badly mildewed. This variety bears fruit very much like the Delaware in shape and bunch. I think the fruit is a trifle larger, and something of the same flavor. The vines were well loaded with fruit, and had not a particle of mildew upon them. That is a very important point.

A member. How is the Brighton.

Mr. Latham. It is a good bearer, and ripens early, and is hardy enough; but it has that fault of ripening unevenly, and so it is not desirable.

Mr. Wilcox. How does it stand mildew? I never had any mildew on mine excepting the year before last, when there was mildew upon almost everything here. Have you had any experience in grafting grapes?

Mr. Latham. I never grafted anything in my life.

Mr. Brand. There is a gentleman living a few miles from here who has about five thousand grape vines. He has seedling grapes about twenty years old, which were grown from a lot of seeds of the Northern Muscatine, Clinton and Delaware, so he doesn't know from what particular vine his seedlings come. He has one that is a little larger than the Delaware, is a little better bearer, and pronounced by a great many people to be a little better grape. He commenced with eight hundred grape vines in 1862, and planted the Clinton first. When they came into bearing, the quality of the fruit didn't appear to suit him. He then planted Delawares and has increased his vines to six thousand; four thousand of which are Delawares. His ground is almost one of the most unfavorable for grape growing that could be found. For two miles north of him, there is an open exposure and he has no protection on the north, and very little on the west. In conversation with a banker about him some time ago he said to me "that is the only man that has made anything out of grapes. He is worth fifteen thousand dollars to-day and has made it all out of grapes."

REPORT OF COMMITTEE ON GRAPE INSECTS AND DISEASES.

REPORT BY MR. HARRIS.

Mr. President, there was so little to report upon this subject this year, that I did not think it worth while to occupy your

time with a written report. Perhaps at no time, in the history grape growing in this state, have grapes been so free from insects in Northern Minnesota as they have this year. In the very early spring there was a few cases of the presence of the leaf beetle, but spring came on a little too fast for them, and the injury done was virtually nothing. About the time the vines came into blossom, which was late in June, we had two or three wet days with fog, and mildew started in some few cases upon the wild grape vines. In my vineyard I discovered only one vine affected by this mildew that is supposed to cause the grape rot later. At Brownsville, Minnesota, I saw some vineyards that had here and there a single vine affected but the weather came off favorable and it spread no further.

Upon my place, I had agreed, with the Commissioner of Agriculture, to test some of their remedies and I made one application of the Bordeaux mixture, and afterwards made another application upon a small portion of the vineyard. As we had no rains that mixture remained upon the foliage and upon the fruit five or six weeks, when I made a second application, I couldn't see that there was any damage done to the fruit. I didn't see a single blossom in the grape that was affected by black rot, or gray rot either, so there was no benefit derived from the application this year.

Their was one insect that I saw in one vineyard in the town of Brownsville which was doing considerable injury. It seems to be the grape curculio. A very small grub hatches out from the egg that is deposited there and matures itself in the grape, and the berries thus affected drop off before the season of ripening, so when you are purchasing grapes you will know you are not buying wormy ones. I suppose the remedy for that insect, would be spraying with arsenical preparations or kerosene emulsions.

It is happy for us in Minnesota, that the alarm starting years ago by the almost universal presence of mildew throughout the state, and not only black rot but some other rot, did not continue all through the last year. If it had increased as such things ordinarily do, grape growing would require a great deal more skill and attention than it has in the past.

REPORT BY MR. LATHUM.

I have not prepared any report as it seems to me there is little to report. We have been entirely exempt from mildew, or any other grape disease this year. The only insect that has ever done any harm here, is the little blue beetle, and there has never been any wholesale injury here from that cause. The year before last, we had enough mildew to make up for the mildew we didn't have last year. Of course the character of the season of 1888 was to blame largely for that. It was first wet weather, and then hot sunshine, and then another rain storm. The air was full of moisture and everything was favorable to mildew. It was a new thing to us, and I tried many experiments which I

will not detail now. But I tried in many ways to combat it; I tried in part the methods that are offered by the Department of Agriculture at Washington for this purpose; I sprayed the vines with several different preparations containing sulphate of copper. These preparations are used as a preventive and not as a cure. It was too late in the season for me to try it as a preventive, and I could not see that it was any good as a cure. I have read with a great deal of interest all the reports that have been put out by the Department of Agriculture. The report of the year before last was very favorable; and the last report, which I received a few months ago, of what was done the year before last, is still more favorable. They have tested various solutions for checking mildew in a great many places in the United States and the results as far as downy mildew is concerned seem to show that almost everywhere it may be controlled. If they can use this remedy successfully in places where the climate tends to aid, rather than to repel mildew; we may hope for some very good results from it here. Our climate is such, that we need not expect to receive as much injury as they do in the East and South. We have not seen here any of the black rot which devastates so many of the vineyards and almost ruins them; so I doubt if we shall ever be seriously troubled with the grape rot. We want to be wide awake however. This mildew pest is something we must fight up here, and we don't want to let it get the start of us.

QUESTION BOX.

"Has this society ever held its annual meeting in the month of February within the last twelve years?"

Mr. Harris. I don't think it ever has.

"Where can small evergreens be bought in this State by the thousand?"

President Elliot. If there is no one here in the State that has them, I would recommend Robert Douglas & Son, Waukegan, Ill. Mr. Lathum recommended David Hill, Dundee, Ill.

"What variety of crabs would be considered the most likely to succeed in Manitoba?"

Mr. Lathum. Mr. President, I would say in answer to that question, the most "crabbed" variety.

President Elliot. I think the large, red and yellow crabs are the two varieties that will succeed there if any do.

"Mr. Barrett in his report of the Lakeside Horticultural Society said that crab apples had done well in that section. What kind of crabs were mostly grown?"

Mr. Barrett. The Transcendent. A gentleman by the name of Matthews who keeps a hotel, on the east shore of Big Stone Lake, about eight miles from Ortonville, has quite a variety of trees in bearing condition, prominent among which is the Transcendent. The Transcendent trees were loaded with apples, and the orchard promised a fine crop, at the time I visited him. A Mr. Boman, of Big Stone County, about four miles north of Mr. Matthews, had a very fine orchard, among those native seedlings, and, had it not been for hail-storms that broke his trees down, he would have a very successful orchard to-day. He set out new trees and they are a success. In my orchard the Transcendents take the lead.

REPORT OF COMMITTEE ON EVERGREEN TREES.

By C. F. Miller, of Faribault.

Mr. President, Ladies and Gentlemen:

The subject of *evergreens* is a subject that should interest the people of the Northwest much more than it seems to interest them; and it is a subject that should not wear out till every farm in Minnesota has at least one thousand evergreen trees planted and growing upon it. They protect us from the howling blasts of winter. While the driving snows are chasing across the dreary plains outside, within their sheltering influences all is quiet, calm and comfortable. A row of these pines running east and west, will save our apple trees from destruction in a great majority of cases, if the fruit trees are planted a little way to the north of them. Several rows (the more the better) growing to the north and to the south of our farm buildings, and a good large grove of them thickly set on the west, northwest and southwest, with a large lawn around and in front of the farm house, tastefully set with handsome evergreens, will give us such a comfortable, beautiful home, as but very few comparatively enjoy here is the cold Northwest. Such a home no one knows how to appreciate better than the happy owner.

The evergreen tree will thrive on almost every kind of soil, from the sandy barren plain, the rocky hillside, to the moist low lands of the valleys, and therefore any rough or unsightly parts of our lands can be planted with them, and make those portions the most sightly of any. Our country school houses should be thoroughly protected with the evergreen belts.

And our roads where the drifting snows are apt to obstruct travel, could be made, by only a little row of them, in a few years, the best part of it all.

If men would go to work and protect themselves as above indicated, fewer people would find themselves stranded two thousand miles or more away from home, whither they have fled in quest of—climate.

Climate is a great desideratum which thousands are after, and

why go abroad for it when you have as good a climate right here in the very heart of the country as you can possibly find anywhere? Go to work and fix up by planting out the God given evergreen trees, thickly and without stint, all about you, and you will thus so modify the rigor of our sometimes severe winters that no other country will have the charms for you that you see here in your beautiful Minnesota homes.

While in California last year my wife was speaking of some of the beauties there. I said I'd give them *all* for only *one* of my fine evergreen lawn trees in Minnesota.

I have been asked *how* I managed to get my evergreens to grow in such symmetrical shapes.

There is no difficulty in making a beautiful tree on the lawn if it is properly trained. The divine injunction is, to "train up a child in the way he should go, and when he is old he will not depart from it." This is just exactly what must be done if you would have fine trees of this sort. First comes the selection of your trees from the nursery. Of varieties, I will say take almost any, except the Scotch and Austrian pines. These are too rough in their habits of growth for a fine appearance upon a lawn. Select those only that are well limbed to the ground about equally on all sides. In digging them, remember that if you expose the roots to the air, it kills your tree in a very short time. The roots, as soon as lifted out, perspire a resinous sap, which coats the bark of the roots over, and they become so hermetically sealed thereby that ever afterwards all communication between the plant and the soil is entirely cut off; and men who plant out such trees, so exposed, had better bury their hopes of them in the holes they dig, than to set the dead trees in them. As soon as dug pack the roots securely in wet straw or moss, for transit. I have never lost any more in transplanting the coniferae, than the deciduous trees. In setting them in the lawn, always dig a good capacious hole for the tree, then get out the tree and sprinkle its roots *at once*, and immediately set in its place, covering with the moist earth and pressing it into all vacancies, and firming the soil about the roots faithfully. Fill the hole up full, then when all are set, mulch well with anything that will retain the moisture, and keep them from drying unduly. I never use water in transplanting; I think its tendency is to harden the ground. I used water many years ago, but I found success was as certain without it; consequently I abandoned it. I think good mulching is as good a cultivation, for young trees, and more practicable for the lawn. Now, early the next spring you will need to go over them, and if all have made a good healthy growth, you can cut all of the ends of the shoots off a few inches, or at least those that have grown out the farthest. Some of the pines, especially the White Pine, do not need so much pruning to keep them in good symmetrical shape. The hemlock, when grown out upon an open space, needs no training at all, or at least this has been the case with one, a very fine one, on my grounds.

The Balsams have a great tendency, in this western country, to run up like a church steeple, and this should be overcome by

watching them closely. Cut the "leader," or topmost shoot one-half off, more or less, as the judgment dictates; and then those shoots that are nearer to the tops should be cut off an inch or more. The judgment must be exercised considerably in training so as to produce a fine pyramidal tree, which will grow more and more beautiful, year by year, until you will have a fine towering pyramid of vernal beauty, that seems to sit with its broad base directly upon the grassy lawn, waving its graceful spray in the sunlight, and casting its dark shadows across the lawn morning and evening, "a thing of beauty, to be enjoyed forever."

The Norway Spruce is too apt to grow out of shape and must be kept down by topping off its too rapid growths.

The White Pine must not be pruned after the terminal buds are formed, but if it needs its too rampant growths checked do it when one half, or so, of the present year's growth is made; then, buds will form on the side of the new shoot for the coming year's growth.

Pruning the evergreen, always causes a more dense growth of foliage, which adds to its attractiveness.

Why is it that we see so many homely thin, scrubby evergreen trees in most every yard where an attempt has been made to grow them? Carelessness, and a want of the proper knowledge is one cause. Another is, that they are often set right under the shade of the deciduous trees, already there, and no evergreen tree can be made to grow with any beauty in a *shade*. Pruning back should be commenced at first in the nursery, and kept up on lawn trees until the tops cannot be reached with the pole pruning shears, at which time a good shape has been established, and, like the well trained youth it will not depart from it.

The early spring is the best time to cut back; and the most proper time to *transplant* for their latitude is about the middle of May.

There is an opinion among many, that after the growth has started, in *June*, is just the time to transplant the evergreen. Don't wait so long, for it is much the better to handle the trees *before* the buds have started. Don't get your small evergreens set too near to each other, if you want fine individual trees, for they will grow to crowd themselves in a few years. I would not recommend setting wind breaks in their rows so *thickly*, as some think best, ten feet I regard as near enough, with another row twenty feet away will in time look better than if crowded more closely, and be just as efficient.

For the lawn I would recommend the Arborvitae, the Balsam, the Norway and the White Spruce. Hemlock and the White Pine. For cattle yards, I would plant the White Pine and Cedar; as the *White Pine* will outstrip any of the whole family in rapid growth, and the *Cedar* gives the thickest foliage and will stand its own shade perhaps the best of any. Those two combined, will, in the quickest time form the most impenetrable wall to resist the heavy wind currents.

It has been recommended by some to plant the Scotch or Aus-

trian pines for wind breaks, as they were the most rapid growers. I quote from one in Illinois who has had a good experience in their culture:

"The Austrian pine made a growth in height of 25 feet in 16 years, and 10 inches in diameter. The Scotch, same age, was 28 feet high, 12½ inches in diameter. The White pine, 14 years old (2 years younger), was 30 feet 6 inches high, 11½ inches in diameter." The measurement was made inside the bark.

In grove planting I would plant largely of the White pine, both for its rapid growth and for its valuable timber. To grow up a grove as quickly as is possible, it should be planted more thickly so that its neighboring shade may cause the young trees to shoot up faster. To do this it would be the best to plant in rows say of 4 feet each way of the *deciduous* trees, with a row of the pines every third or fourth row, and cultivate for 3 or 4 seasons so as to keep down the weeds and to keep the young trees growing, keeping the young deciduous trees cut away only so fast as would be necessary to keep them from over-topping the evergreens, and to keep their shade against them so as to keep a steady upward growth.

In growing up a forest or grove we must not lose sight of the object to be attained. We want tall fine straight bodied trees. We cannot afford to be so long in getting them as to let them limb out all along up their bodies sending the sap and the growth into side limbs that must, as the grove gets larger and begins to shade itself, die off.

We must shade it while young, and the way I have indicated seems to me to be the best and the cheapest.

Tree seeds and cuttings are most abundant and cheap, and is, I think, the best to use here. Young *evergreen* trees would be too expensive.

As above stated, but few can tell of the solid comfort that man and beast enjoy, except the fortunate owner of an evergreen home, such as I really wish every one could have in Minnesota. When Old Boreas comes down here from his hyperborean home away up there among the icebergs, with his icy chain in his hands to lock up our lakes, rivers and streams, and when the "beautiful snow" descends upon the cold earth like a white bird out of Paradise mantling and covering the whole face of nature in a garb of pure white. 'Tis now that the beauties of the evergreen copse and lawn shine forth. The white tufts of snow perched upon the ten thousand green branches all about our dwelling transcends by far those calla lilies that we saw in California growing by the sea in January.

And when the winds of winter get on a rant, howling through the tops of the bare maples, basswoods and elms of the forests, your home is all nicely and cozily sheltered from their rude attacks. Your stock stand quietly in the sunshine of midwinter chewing their cuds, and could they speak, we fancy they would thank their owners for their efforts and good sense in thus providing such a haven of rest for them in winter. The *protection*, the *beautiful appearance* and the fragrant balsamic odors which come from the pines in summer should all be strong arguments in favor of their cultivation.

President Elliot. Here is a short article from a gentleman that is very highly respected in the State of Minnesota, by those who know of him and of the work he has been doing here for the past two or three years, as landscape gardener for the Park system in St. Paul and Minneapolis. I sent him a card asking if he would give us a report, and this is the answer that he gives:

LETTER FROM PROF. CLEVELAND.

Wyman Elliott, Esq., President Minnesota Horticultural Society:

Dear Sir:—Your card was duly received, inviting me to make a "short comprehensive report on deciduous trees"—to be rendered at the meeting of the Soc, (21st and 24th inst.)

Fully appreciating the honor you do me in thus inviting me, I regret my inability to comply,—first because I am so fully occupied with professional labor that I have no time for other occupations—and secondly because I feel myself entirely incompetent to do justice to the subject. I have been a resident of the State but five years, during which my work has been almost exclusively confined to the designing of Parks, and having had no previous experience here I have had to be guided by what I could learn from older residents, and in planting the Parks have confined myself almost exclusively to well known native varieties.

My object has been to secure abundance of foliage in the least possible time, and I could not afford to experiment with trees that were doubtful. I have, of course, been as active as possible in gathering what information I could from others, but should consider it derogatory to the respect due your Society to offer such *second hand* knowledge, for the truth of which I could not vouch.

The only doubtful tree that I have experimented with is the *Catalpa speciosa* and my experience with that affords matter that may possess interest.

In the Spring of 1886 we planted on the different Parks of Minneapolis one hundred or more of these trees. They showed not the slightest sign of injury from the intense cold of the two succeeding Winters when the mercury fell to 30 and 40 below zero, but last Spring after the mildest Winter perhaps on record in Minnesota, great numbers of them showed more or less dead branches, and some were killed to the ground, though all came up again from the root.

I should be glad to hear the experience of other planters, and to learn how they account for the above.

One other plant I have experimented with, and am hopeful it may succeed—the Japanese Ivy (*ampelopsis veitchii*). It is entirely successful in Boston and Chicago, *if protected for the first two or three winters*, after which it is as hardy as any native tree.

I have several plants that came through last winter with slight protection, and am hopeful we may secure what is the best substitute that has yet appeared for the English ivy. I venture to enclose a photograph which will show you its effect (title on the back), which I shall be happy to *loan you* for exhibition, to the society if you wish, but *trust that you will not fail to return it to me*, as it is of great value to me.

Truly yours,

H. W. S. CLEVELAND.

President Elliot. Can any one give any reason for this? Mr. Dartt what is your theory?

Mr. Dartt. I have no theory as to the injury to the upper limbs, but my theory as to the injury to the bottom is, that the snow line was down very low, and there being frequent freezes and thaws, the effect of the snow line was greater than at some other times when it might be colder.

President Elliot. How did it effect your catalpas?

Mr. Dartt. There were one or two of them that had stood the winters before, that were from six to eight feet high, that were killed clear down, and sprouted from the roots, but the majority of them stood out and started within a few inches of the tips of the limb. They are all killed back a little every year. They have not started from the terminal buds or nearer than three or four inches. But still they started out fairly enough so that they made a fair growth. The trees were killed as all of the new growths were killed by the frosts in May. The last day of May there was a severe frost, and the new growth was killed back, and in some instances the trees did not start as far out on the ends of the limbs as they did the first time. All of the young catalpa trees were killed to the ground last winter.

President Elliot. I want to throw in a little idea. The point that is brought to our notice is, that these trees were injured in a mild winter. Mr. Dartt touched upon the theory that the freezing and thawing of those trees close to the snow line injured the bark at that point. I don't know whether these trees came out the same as a root killed tree would. A root killed tree, if the roots are injured in the winter, has vitality enough in the top to leaf out. I don't know whether these did or not, but if they did, I should say that the injury was right there at the snow line, and a slight protection there, would have saved them; and it is a question in my mind whether we are giving the protection to the bodies of our trees that we should.

A recess was here taken until 7 o'clock p. m.

WEDNESDAY EVENING SESSION.

JANUARY 22, 1890.

The meeting was called to order by President Elliot.

Mr. Barrett. Our worthy President asked me by letter if I would prepare a paper upon Horticulture among the Masses. I responded that I would, and have to say at the outset that you who know me personally, know, perhaps, that I am always on what I might perhaps claim to be the forward line, and if there is a possible chance for advancement, my idea is we should improve it carefully.

Mr. Barrett then read the following paper:

HORTICULTURE AMONG THE MASSES.

By J. O. Barrett, Browns Valley.

The cow, the horse, the hog, the sheep, the fowl, the grains, the garden vegetables, without them we would starve. But with nothing more of productions, the young folks better educated than the old folks, generally grown weary of the farm, crowd into the cities and there fight a harder battle than before, for great cities are but "cancers on the body politic." What is the matter with New England farms, that they are so abandoned? It is not alone because they have not paid; they lack the relief of the social and other varying associations. The everlasting tread mill of stock-raising, of raising a little patch of corn and potatoes, of hay and a few vegetables, became an irksome thing, etc., dulling to esthetic ideas, that the energetic young men and women, outgrowing the moulds of their environment, leave in disgust, and New England today is shipping in frugal Scandinavians to reconstruct the agricultural ruins. And it will soon be so in our fairer west unless early and more vigorous efforts are made to keep the boys and girls on the farms. Education has so refined our senses these times that every machine, and vehicle, and tool, and piece of furniture, and garment, and book, must not only be practical but a finished beauty, else we are not satisfied. Without some sort of enchantment, without flowers, and their fruits, most of us are uneasy and want to get away to break the monotony. What so enlivens us to do and dare, as drama and song? What so lessens the worry of domestic drudgery as clumps of roses, or pansies, whose sunny faces look like so many fairies peeping out from the ground? What so readily combs out the wrinkles of care as singing birds and laughing voices? What so attaches us to home "be it ever so humble," as trees and vines, and ample supply of juicy strawberries and other berries and plums, raised in our own well cultivated gardens? Farm life needs all these appliances to make its tenure sure.

There are two functions in the direct supports of life—agricul-

ture and horticulture. Though special in use they are correlated close as the auricle and ventricle of the heart. To separate them, neglecting horticulture, is farming "at a poor dying rate." Credit the farmer when he has the best varieties of stock and takes right care of them. He knows that thoroughbreds must have food and treatment corresponding with their advanced conditions. Does not the same law hold good with human beings, that, if we would have first-class health and character, we must have first-class food, and first-class every thing else? We shall have purer blood, clearer brains, better morals, when our diet consists mainly of the fruits. This is the first step toward the millenium; for all these live closer to the "soul of things."

Amid the growing demand for such food, the question turns again, can Minnesota and the Dakotas raise the fruits to practical advantage? Every experienced horticulturist in these states answers in the affirmative, with the proviso annexed—"when we rightly prepare for it." We have a quality of soil and climate that are susceptible of producing the best of indigenous fruits. The difficulties we have to encounter are lack of forests to mitigate the rigors of heat and cold and economize moisture for the annual drouths, lack of water reservoirs at the river sources, and lack of farmers willing to post themselves in horticulture and willing to apply what they do know? In this business there is such a faithlessness and stupidity, the horticultural battle has to be fought over and over inch by inch, paving the way that others may be blest for our sacrifices.

After long years of experience, the practical conclusion is then simply an annual meeting of the State Horticultural Society with an able report of its doings given away, creditable as it all is, does not fully supply the great need. Nor do our horticultural articles frequently published in our agricultural journals suffice. All these are helps and we cannot afford to lessen our energy in these directions. We have again and again rung the changes upon the necessity of forestry, yet little comparatively has been accomplished. While we have been trying to build up, syndicates, indifferent to others' weal, have been destroying for lumber in other directions. It is a fierce struggle to gain the mastery, especially where so many are so indifferent about any trees for home or country. The conditions evidently demonstrate what ought and can be done. Our Society should be made a more consolidated force and fortified in members that naturally belong to it. Suppose now the fruit committee annually sent out to discover new and valuable fruit plants, be either enlarged or merged into a Missionary Board, appointed by the executive of this Society from its members, consisting of persons who have had experience and know how to express it, to whom shall be entrusted the great work of arousing the people to activity in horticultural industry. Their business would be to hold meetings where they can, singly or in concert, organize branches of the State Society, procure names and residences of persons who have interest enough in trees, flowers and fruits to grow them; correspond with such, encourage horticultural experi-

mentation, circulate information of this kind with the energy of blood through the arteries and veins of the body, in short be the outside working hands of this Society, persistently laboring with voice and pen anywhere wanted, and everywhere evoking a demand to learn practically our beautiful and scientific art. Here is a step which we can safely take, using such finances as can be spared so as not to injure any adjunct of our State enterprise. If only a small sum, not more than four or five hundred dollars can at first be appropriated for this purpose, venture on that, and with success so far gained, we can in another year, or two, sufficiently popularize our practical method so as to command the special support of legislation. Let us not hesitate to do our whole duty, wisely and perseveringly.

There is another matter in this connection equally deserving our best thought, and that is the introduction of horticulture into our common schools as a legalized branch of education. No science is more important, nor one so intimately allied with the health and prosperity of all the people in city as well as country. This makes horticulture the associate and crowning excellence, as it is, of botany, of geology, of agricultural chemistry. Let us have this in view, and as fast as we can gain public approval and co-operation; press forward till we have a text book of botanical and geological horticulture in the higher grades of all our schools. We who project these measures of advancement may not personally enjoy the harvest of our seed-sowing, but it will be indeed a precious reward if from the verges of the heavenly land given us for faithful labor, we can see our successors gathering in the fruits of the Eden which we cultivated with our hands and watered with our tears.

President Elliot. We have another paper in the same line and I think we will not stop to give this any discussion just now as Mr. Gould has a little pepper and salt which he wishes to introduce. We will take that now and then we will take another line of thought.

Music by the young ladies.

Prof. Pendergast, being called upon, said: Mr. President, Ladies and Gentlemen: I will say that most of the time for the past two weeks I have been down with la grippe and am sick abed now. (Laughter)

THE FARM SCHOOL AS RELATED TO HORTICULTURE.

By Prof. W. W. Pendergast.

The School of Agriculture of the University of Minnesota opened its first session a little more than a year ago with seventeen students. It now has an enrollment of seventy-six, and the number is constantly increasing. The encouragement it has met with; the substantial patronage it has received and the high character of the young men who are availing themselves of its advantages are as

gratifying to its friends as they are surprising to those who at first questioned the demand for such an institution and doubted the necessity for its existence. The plan upon which it is based is new but it has already proved its right to live and that it has met the long felt want. Though its sessions are held in the winter, a season, it must be confessed, not the best adapted to instruction in the various methods of performing the different kinds of farm work, yet its course is exceedingly practical; the barn, the stock, the dairy, the greenhouse, the trees and the shrubbery afford convenient illustrations of the lessons and principles with which the students are expected to familiarize themselves, though of course they are not so abundant and satisfactory as summer would furnish, but at that season the boys could not be spared from the farms, so we cut our garment according to the cloth.

While the outlook for the future is decidedly encouraging, still "a tree is known by its fruits." If this school is to prosper in the future and meet the expectations of its friends; if it is to receive continued support from the State and constantly increasing patronage from those for whose special benefit it was designed, it must by its fruits prove itself worthy of this support and patronage. The young men whom it trains and finally sends out into all the counties of this great State, to carve out their fortunes by honest industry, must be better citizens, more intelligent thinkers, more systematic planners and more determined workers for the drill which they have received. They must practice better methods, make fewer mistakes, get more of the sweet things of life and less of the bitter than the average farmer who has never received the advantages which they have enjoyed. Their superior judgment should be noticeable in the location, plan, and economical construction of houses, barns, and out-buildings, in the planting of shade and ornamental trees, wind breaks and orchards, in adding to the joys and comforts of home by supplementing the products of the field and farm with the various delicious small fruits which are at home in this State, and with a well-kept garden.

In all these various ways which I have outlined, as well as in scores of others which might be named, the work of this school should tell upon its students and through them upon the several communities in which their lots may hereafter be cast. We are apt to spread our work over too much ground. Our guns are bell muzzled and by wide scattering sacrifice efficiency.

As countries grow older and population becomes more dense from very necessity, labor is concentrated on narrower areas. Men, thus being obliged to cultivate less surface and therefore do it better, find that the results are more satisfactory, and so from hard necessity they learn what good judgment and intelligent forethought should have told them at the outset, viz: that a *little* well done, is better, more profitable and far more satisfactory, than an attempt to cover a large area, which often proves abortive, and generally ends in disappointment. One of the important lessons which our school will try to enforce, is, that no more work should be planned than can be thoroughly executed; that as much as pos-

sible shall be made of a little, and to that end considerable stress is laid upon gardening and fruit culture, not to encourage experimenting upon those varieties whose hardiness and productiveness have not been fully demonstrated, but to make each home more attractive, and to multiply its comforts and even luxuries by surrounding it with an abundance and variety of delicious and healthful fruits and vegetables which even our barren climate permits.

It must be admitted at the beginning, that in this department, perhaps, more than in any other, the fact of our sessions being held, and instruction given exclusively in the winter, it is not practicable to impress upon the minds of the students clean cut impressions of many horticultural operations as would be possible during the growing season. Still there is much left that is of the greatest importance, which *can* be done, notwithstanding we are shut out from actual work in garden and shrubbery. The students can be made familiar with the latest and most approved methods in the departments which are under discussion, and the reasons which should compel their adoption. These reasons can be so clearly presented, and the arguments in support of these methods so conclusively given, and the methods themselves so well described and illustrated by such material and means as we have at hand, that the attentive student will have little difficulty in the practical application of them in his own actual work.

In the matter of vegetable gardening, the boys can be instructed in the proper preparation of the soil, when and how to plant the different kinds of seeds, and the reasons which determine the manner recommended, the nature of the different plants may be taught and comprehended. Students are to be familiarized with the best methods of transplanting, and the time when it can most successfully be done; with the most efficient and economical modes of cultivation, the time and manner of harvesting, and marketing, together with the safest rules for winter storage and preservation.

FRUIT CULTURE.

We find no difficulty with the means at hand in giving practical lessons in budding, grafting, layering, and pruning. Students are taught the proper location, care and cultivation of fruit trees, vines, berries, &c.; how to pack and market all the kinds of fruit which can be profitably grown; how to grow and handle nursery stock.

GREENHOUSE STRUCTURES.

Under this head we are to give necessary and wholesome instructions in the formation of hotbeds, cold frames, and greenhouses, and the propagation of plants from soft wood cuttings, calling particular attention to those matters which are essential to success, and pointing out with clearness and minuteness the most common mistakes which cause failures, such as injudicious locations, improper ways of protection, heating, planting, &c.

ORNAMENTAL TREES AND SHRUBS.

In ornamental planting, we can instruct in the planning, laying

out and adornment of grounds with trees, shrubs, lawns, &c., and encourage the students to resolve that in their own individual cases, at least, they will take one step in advance of the average farmer of today as far as regards the improvement of the most important acre on the farm, that on which the home is situated. How desirable and, considering the value of the result, how inexpensive to make that acre the most charming and delightful spot on earth to the owner and his contented family! Protected by thick trees on the north and west from the biting blasts of winter, he may, in comparison with the denizen of the bleak house on the treeless prairie, measurably defy old Borealis Rex in his winter's wrath; and in summer, his advantage over his unfortunate neighbor is still greater. Instead of a pitiless sun pouring down his burning rays upon an unshaded roof he has a little eden around him. The same friendly branches which arrested the rough winds of winter, now defend him from the scorching heat. The green grass of the lawn and the bright flowers refresh his eye; the winds waft him perfume, and the trees are vocal with the sweet music of birds.

FORESTRY.

We can show the effects of forests upon climate, give unanswerable arguments in favor of planting trees, aside from those distributed about the home, for purposes of protection and ornament; advise as to the proper locations for them, the kinds best adapted to the various purposes for which they are designed, the best methods of procuring, transplanting and growing the same. We can show how an interest in horticulture and kindred pursuits bears directly upon and favorably influences country life in supplementing the income of the farm, and enhancing the owner's pecuniary profit, and thus strengthening the bread and butter argument, which, after all, is of light importance compared with the additional comfort, happiness and æsthetic culture which it brings.

DIFFERENT IDEAS OF EDUCATION.

In regard to the appliances which we have for illustrating horticultural work, and the practical application of it, I would say that although we cannot do as much in this direction as if our sessions were in the summer, this is not so great a misfortune as many would at first suppose. There are two classes of ideas in this State, and in the country—two kinds of people. One class thinks that in an agricultural school nothing should be taught but actual farm work, that the students should be shown how to draw a straight furrow, how to plant corn and sow wheat, cultivate all the grains and garden vegetables according to the most approved plans, and that it should all be done by practice and imitation; that, in fact, these agricultural schools should give instruction in nothing but methods of performing the various operations of the farm and garden. Not long ago I heard one of the most eloquent speakers in the State

deliver a speech on education. He commenced by saying that our present system was from beginning to end a rank heresy. The great question to be solved in this country was that of bread and butter, and it was our business to teach the boys and girls how to do those things that they are to follow for a livelihood in after life. The boy must learn how to shove a plane, turn a horseshoe, and how to perform the different kinds of work that he may be called upon to do after he leaves school, and he was cheered to the echo. He denounced education for culture, (and by the way he pronounced it "culchaw"), but believed in that kind of education that would lead our boys and girls to perform honest labor; that only about one-twentieth of the people were necessary to do the higher work of the country and take care of the government, the work that required a scholastic education. And he said, you need not trouble yourselves about that matter. The necessary twentieth is going to get that education anyway and the public need not tax itself to provide it. I came very near interrupting this speaker to ask how we could be assured that the small percentage of boys and girls which he promised us, would be the ones the nation *wanted to do its business*.

He omitted to tell us in which class he expected his own boy to find his place. Now, it is very easy for me to see,—and although the audience cheered at every step, if they had taken a minute's thought it would have been easy for them to see that the fortunate or unfortunate one-twentieth who were to receive the thorough disciplinary education would be the twentieth that had rich parents. They would be prepared to do this higher work and it is no matter whether your boy or my boy understands how to do it or not. The second class of agricultural educators hold that the object to be pursued in schools of this character is while giving a thorough drill in the science and art of successful cultivation of the soil at the same time to develop the thinking powers, to put the boys in such a condition that they will be better able to fight their way in the world with more determined purposes and more resolute wills, to endow them with noble independence, with more manly self-reliance; to elevate their reasoning powers and strengthen their judgment, so that they will be better able to take care of themselves and occupy a higher position both as farmers and as men; that they may become more useful members of society and better citizens of the State, so that they can stand up for their rights and intelligently defend them. They are not the true friends of labor who argue that the working classes are simply required to know how to do their daily work in the field or shop and not anything else.

When I was on my way down east a few days ago I passed through Springfield, Massachusetts, and while on the train, entered into conversation with a man who told me that he had lived in that city for the past thirty years. He said he had stood at the same place in the Armory all that time, and his feet for ten hours each day, had hardly moved a foot from the spot assigned at the same bench, and the only thing he knew how to do was to file gun-cocks. Is that the extent of knowledge we wish our farmer's boys to possess? What we do want to do is to send them out good thinkers and earnest workers trained to depend upon themselves to meet obstacles and overcome them, and when anything goes wrong to ferret out the cause and set it right.

Now it seems to me that the idea of teaching by imitation, just as a parrot learns to talk, is fundamentally wrong; is the very kind of education that will dwarf us as farmers and horticulturists and as men. That is just the education that the peasants of Europe are receiving; while it must be admitted that they are raising such crops as would amaze us here in Minnesota, but do we want our farm boys to be like the emancipated serfs of Russia, ignorant toiling drudges, with nothing to brighten their sunless homes and and no hope of better times to come? That is just what we don't want. Nor do we want to make machines of them like this man who stood at the bench in Springfield and filed gun-cocks all through those thirty dreary years. This whole question of labor and capital and trusts, monopolies and boycotts has got to be fought out on the educational field and when we make the farm boys and those that are working at trades the most intelligent people in the whole broad land we shall not be able to find any other class of people that can grind them down or oppress them. They will be in a position to protect themselves and dictate terms to others and they are going to do this through the medium of improved public schools and that, in the not very distant future.

President Elliot. Now, I have a short article here from a gentleman that has recently come to this country. He has had only about eleven weeks of education in our country schools, and here is what he says:

HORTICULTURE AMONG THE MASSES.

By Gust. Malmquist, Minneapolis.

Noticing you have this subject on the program, I wish to make a few suggestions as to the best means of promoting interest in horticulture among the people

In Sweden, a good many different system have been tried with

more or less success. There, it is conceded, that the best way to awaken interest in the subject, is to teach it to the children.

For that purpose, there is a small garden attached to every school house, where it is possible; and about 25 horticulturists are employed to travel in their respective districts giving instruction and laying out and superintending school gardens. The teachers are also instructed in horticulture at the colleges.

The school gardens have a small nursery from which trees and shrubs are distributed among the children, and each child has a small piece of ground in its especial care.

This system has already proven successful and I believe something similar would be found beneficial if introduced in this country.

The state agricultural department also offers premiums for treatises, on the different topics in horticulture, for distribution in pamphlet form among the people.

The greatest drawback to horticulture today, I believe, is the present system of selling nursery stock. If the nursery men did not employ any middle men in disposing of their stock, but dealt directly with the consumer, a great deal of evil would be avoided. People get disgusted and refuse to buy after they have had a little experience with tree agents, and I can say from personal experience; that I have not yet been treated fairly by any agent I have dealt with, and as a rule they never show up a second time.

President Elliot.—If there are any points that have been touched upon by these three papers that you think is worthy of discussion, now is the time to bring them up.

REMARKS BY MR. SOMERVILLE.

Mr. Somerville being called upon, said:

Mr. President, Ladies and Gentlemen: I am not in the habit of speech-making or talking in public very much. The most I know in regard to horticulture is gathered from my own experience, and from what I have learned by years of practice, and what I have observed in traveling about the country. Perhaps I am an enthusiast in regard to trees. I have always taken great interest in them, and I like to see them around every man's farm. I was out west—just came home a few days ago—and to see the barren prairies in the western part of this state and in Dakota, without a tree set around the houses or around the barns, to afford protection for either man or beast, really caused me to think, at the time, that these people were not good citizens, and I have not changed my mind much since.

Now, in regard to getting, in some way, before these people the importance of growing timber and doing some true missionary work; in my opinion that would be one of the best key-notes which

has ever yet been struck. The books that are published by this society are only received and read by a few individuals. We meet together and talk these matters over among ourselves, but these meetings do not exert the influence on the community they ought to have, or that we would wish them to do. Now, how are we going to work up that interest? The people appear to be dead to their own interests; how are we going to wake them up? I feel satisfied that if we could employ some man to go over this state and hold meetings with the farmers, and get them together and teach them that trees are necessary for their well being, for the protection of themselves and their live stock, it would be the proper way to awaken an interest, and in this way you could wake them up to a sense of duty to themselves and the community in general. I believe that all the state and government aid that may be extended, without proper missionary effort of this kind, will never accomplish the desired results. With the right kind of man traveling around in this way, it is my opinion that an interest might be awakened among the people; that they would see for themselves the necessity of having trees to protect themselves, and to make their homes more attractive for themselves and their families.

As this gentleman has just remarked, the only thing that will keep the boys at home on the farm, is to make it attractive. You cannot do it without educating them. Home becomes dreary to them and they want to get into the city. We must stop this. We must try to get the people educated to the importance of making the home more attractive, and then the boys will not want to go away. If we will curtail a little the book that we publish, getting it down to a smaller compass, and then send a man into the different counties, who will go to the principal towns, to try and get the people aroused, I am satisfied we will succeed in this matter. It is a well-known fact that if the people think they can't raise fruit they won't try to, and for that reason it is neglected. It has been neglected in the past and will be neglected in the future, until this reform is brought about.

REMARKS BY MR. ALLEN.

That sort of wakes up a channel in my mind. I am fond of home and always was. It looks pleasant to me now, when I look back to old Connecticut, among the rocks and hills. When you talk about educating a boy to love his home and stay at home, you must take a different course from what most of us out West are taking. Now, that gentleman gave us a beautiful picture of what a home ought to be, but you find such pictures as that scarce

on these prairies here in Minnesota, and the only way we can educate a boy to become interested in the home, is to give him a part of it; I don't care if it is not more than a turkey's leg—give it to him—give him something so that he feels he has a responsibility, and then you have got him. If he takes good care of the leg, give him a part of the turkey, and so on until he gets a whole one, and in that way he becomes interested, and he will feel that part of the home is his, and he will soon love it. We have discussed several times at our farmer's club at Red Wing how to get the boys to remain on the farm. Someway or other it has been wheat, hogs and cattle, the boys get tired of it, and push west. Some of us are adopting a different plan. I have a little family of my own at home, and I am going to keep them there just as long as I can. My oldest daughter made up her mind that she must be doing something for herself. That was all right, of course, and it was proper that she should. I said to her, "Now we have plenty of land, finely located, and our strawberries are paying pretty well, pitch into it, have all the land you want; go into it and try it, for an experiment." She took hold of it with a will and is doing well. My next, the youngest daughter, said, "Father, I haven't anything." "Well," I said, "How much capital have you?" She said she had seven or eight dollars, and I told her to buy a swarm of bees. The thought struck her at once; she did so, and is now doing well with her bees. My boy took a notion to attend a Commercial College and educate himself for the city. He tried that awhile. I said to him, "Come home and I will give you an interest in the garden." He has done so, and we are working together there. We fail if we don't give the boys and girls something to do; they feel they must get out and do something for themselves. I think the greater training should be on the farm; teach them to enjoy the farm and its surroundings, and they will become attached to it, and will make better citizens.

REMARKS BY MR. HARRIS.

I do not want to occupy the time but I do want the floor long enough to highly endorse those ideas that Mr. Barrett has advanced to us. I have been at work in Minnesota, in this horticultural line, over half my life; I came to Minnesota just to make a living. I soon saw that the state was in a very sad condition. Most of the people said you can't grow fruit here. I pitied them. I made up my mind that I would devote all the money that I could make, and all the energies I had in trying to educate my fellow men up to that point which would place Min-

nesota in a condition in which life would be really enjoyable. My first opportunity to do anything was really with this State Horticultural Society. Well now, we have worked along with this society twenty-three years. We have educated a lot of men up, men that were so bashful in their younger days that they couldn't pop the question to their sweethearts, who are now the most eloquent speakers and the legislators that assemble over in St. Paul are not to be compared with them.

The field does not seem to be large enough. Now, can we adopt the methods that are presented here tonight and carry on this education over Minnesota; go right into the schools and homes and get together a crowd of boys and illustrate this principle of horticulture and of ornamenting homes and school houses, and the methods of propagating seeds and plants? I never talked to an audience that has done me so much good as this one has that is gathered here tonight.

REPORT OF THE ENTOMOLOGIST.

By Prof. O. W. Oestlund.

Mr. Chairman, Ladies and Gentlemen:

My position to-night reminds me of the Bible story of the good and the bad wine. You know it was the old custom to first serve good wine, and then, when they were all pretty well served, to bring forth that which was not so good. To-night, I am afraid it will be reversed. I feel that my report is rather weak. Time and opportunities have not been such that I am able to serve what I would like to.

Some fifty species of insects are known to be injurious to the poplar. Dr. Otto Lugger has given us an excellent account of a few of the more destructive ones as found in Minnesota, in bulletin No. 9 of the experiment station. I shall supplement these with a few notes on one of the gall-making aphids, or plant-lice, as they are more commonly called, found to disfigure young poplars to a great extent in this part of the state.

Pemphigus vagabundus (Walsh).—Constructs one of the largest and most conspicuous gall of all the Aphididæ known. It measures some two or three inches in diameter when full grown, and persisting through winter on the twigs becomes doubly conspicuous after the leaves have been shed. This gall is started by a single aphid, not larger than a pin's head when just hatched, almost too small to be seen by the unaided eye. The life-history of this gall and its inhabitants is briefly as follows:

A great many insects pass through the winter in the egg, to which the family of aphids make no exception. These winter eggs, as they are often called, differ from those hatched the same season

as laid, by having a harder shell and by being abundantly covered with a gummy substance, like many of the winter buds of trees, notably that of the poplars themselves. This gummy substance not only cements the egg firmly to the twig but acts also like a coat of varnish to the egg against the moisture and inclemency of the weather.

The eggs of the species in question do not hatch with the first appearance of the buds in spring, as is the case with most of the tree-feeding species, but they appear first about the middle of May, when the young twigs have already made a growth of some two to four inches in length. The young aphid ascends immediately to the very top of the twig and stations itself on one of the tender leaves just expanding, thrusts its setæ into it here and there causes it to contract over the insect and form a hood-like covering which soon develops into a gall. After the gall has thus been started and affords a protection to the young aphid it is ready to undergo its first moult, four of which are passed through before maturity is reached.

As some of you may not quite understand what is meant by a moult as applied to insects, a few words of explanation may not be out of place. Insects are soft-bodied creatures without any internal skeleton or bones as found in all higher animals, but their body derives its firmness from the hardening of the outer skin, forming a crust like the shell of an egg, to give a familiar example, which corresponds to the skeleton as commonly understood. Now if we should suppose an egg to grow we know it could not do so without breaking the shell, and would need to acquire a second one to take its place. This is what takes place among insects when they pass through a moult. Our little aphid just hatched is rather soft and allows of some growth, but soon on exposure to the air the outer skin hardens and all further growth would be stopped if provision was not made for the growth of a new and soft skin under the hardened one which is now thrown off and allows the insect to expand and materially increase in size again for a short period of time. Thus the outer skin is cast off four successive times in the course of about two weeks, and the insect increasing in size after each, is mature soon after the last, when it begins to bring forth young aphids of the second generation. This first individual starting the gall has been called the stem-mother by Prof. Riley, a translation of the same word used by German entomologists, and may well be appropriate as she continues to bring forth young aphids for more than a month, when from one to two hundred individuals are found in the gall, which are all her issue. Soon after this she dies without ever acquiring wings or leaving the gall.

The second generation differs from the corresponding stages of the stem-mother by a longer and somewhat narrower body; in the antennæ at first four jointed, soon becoming five jointed and much longer in proportion to the body. They are also more active, wandering about in the gall from which deriving their nourishment and acquiring full growth in it just like the stem-mother. They also pass through four moults, increasing in size after each.

After the third moult they show rudiments of wings, and are then known as pupæ; after the fourth moult the wings are fully acquired, a short time after which they all leave the gall and take to flight.

The galls are all empty about the first of August and some turn black and dry up though remaining on the twigs through the winter.

The species has no further connection with the gall after the second generation has taken to flight but continues under very different conditions. What these conditions are is still a mystery. Not even the late Lichtenstein who has given years of patient study to this group in Europe has been able to give any satisfactory explanation. But that many of the gall making species actually leave the galls and pass a part of their existence under very different conditions has not only been put beyond reasonable doubt by the observations of Lichtenstein but is also carried out by my own.

Many entomologists, though have doubted this migration of aphids and actual observations are still wanting, except for the hop-aphis which belongs to a high ground that do not make any galls, but it has been shown by Prof. Riley to migrate from the plum to the hop plant. This at least points in the same direction.

From the great number of galls found on young poplars in the city of Minneapolis during last season millions must have taken to flight after the middle of July. But although the characters of this second generation is so marked that there can be no difficulty to recognize it wherever found, I have never succeeded in coming across a specimen outside of the gall, unless in a spiders web from which no conclusions could be drawn. I have examined almost every plant in a radius of several miles of this city and I am familiar with more than a hundred species but none of which is the one in question.

Lichtenstein, from this study of a closely related species in Europe, thinks that it migrates to the roots of certain plants where it continues until the true sexes are produced in the fall which couple and the females return to the poplar to deposit the fecundated eggs. Careful observations and experiments can alone establish this.

Benjamin Walsh, who first described one species, also found at other times two species belonging to the same genus, in nests of ants, which he has described as distinct. In case that Lichtenstein's supposition of migration to roots of other plants should prove correct, it would, at least, be near at hand to suppose that Walsh's *Pemphigus formicarius* is nothing but the missing link in the life history of *Pemphigus vagabundus*. This will at least deserve the careful attention of the aphidologists of our country.

My observations in nature goes no further than to the flights of the second generation on deserting the gall. But by confining some of these on branches of the poplar, I found that they would not feed, but wander restlessly about trying to escape, and a few that were pressed by hunger to attempt the food, evidently found

it not agreeing, as they all died in the course of a few days. Other species feeding on the leaves of the same branch were thriving exceedingly. A few of these confined specimens began to bring forth young aphids of the third generation, which showed even more activity than either of the two previous generations, wandering about very restlessly without even attempting to feed; they all perished in a short time. The food plant of the second generation after acquiring wings and of their immediate issue, is, therefore, not the poplar but some other plant. The active habits, long beak and other characteristics of the third generation would indicate that they feed on harder parts of a plant, as the bark or twigs, not excluding the roots.

A short summary of the life-history would, therefore, give us the following stages :

1. Egg hatches about the middle of May.
2. The stem-mother starts the gall in which she passes through four months in the course of about two weeks; begins to bring forth the second generation about the first of June, and continues through the month, after which she dies without leaving the gall.
3. The second generation also passes through the customary months in the gall; all acquire wings and leave the gall about the middle of July, when they migrate to some other plant, yet unknown.
4. The following generations are now continued under different conditions, until in fall, when the true sexes are produced, which couple, and the females return to the poplars to deposit the fecundated eggs.

In places where this species should become so numerous as to need some check, the best remedy would evidently be to pluck the galls and destroy them during the month of June, before the second generation has taken to flight. The galls are almost all confined to young trees of six to fifteen feet in height, so there is no great difficulty in reaching them. Picking the galls after the middle of July is, of course, of no use, unless to remove them as unsightly objects.

President Elliot. We have another paper in this direction by Prof. Luggar.

INSECTS INJURIOUS TO SMALL FRUIT.

By Prof. Otto Luggar, Ph. D.

Ladies and Gentlemen:

Before entering into a discussion about some insects injurious to currants, blackberries and raspberries, which are, perhaps, all well known to you, permit me to make some general remarks as to how noxious insects multiply, and the methods employed by nature to check any undue increase.

We all know that all insects undergo a number of metamorphoses before reaching the age of sexual maturity. These metamorphoses are more or less abrupt, though the differences between

the various stages are usually very well marked. The first stage, that of an egg, is common to all animated beings, be they animals or plants, and consequently every insect hatches from an egg. A sudden increase of insects is therefore not due to any mysterious or unexplainable phenomenon as some ignorant people are still inclined to believe, but to the previous greater abundance of females. These females prove by their very numbers that atmospheric and other conditions were very favorable to their well-being, and that they had an abundance of food. Being in such a healthy condition they deposit a very large number of eggs, which in due time give forth the young larvæ, caterpillars, maggots, worms, or by whatever name they may be designated. If one acre with any kind of plants harbors only one hundred female insects, but very few persons will ever notice their presence at all. But let each female deposit only 500 eggs, by no means an exaggerated average number, and all of a sudden 50,000 hungry caterpillars or worms appear upon the scene. What remains of the vegetation upon that doomed acre is not a paying harvest, and even the worst observer, if not entirely blind, will now notice that this field is teeming with life, and he will very likely wonder whence came this multitude. *Suitable climatic conditions and plenty of food are the causes of the rapid increase of all insects.*

The former are not under our control, as the sun will shine with equal force upon saint and sinner. But we can control to a great extent the amount of food which we grow for our insect foes. The modern tendency is to grow as much as possible only one kind of crop, because it is easier and moreover cheaper. But every farmer and horticulturist in doing so, does his very best to induce the undue multiplication of such insects that are fond of that very same kind of plant; he spreads the table with the most inviting and improved morsels, and says to his enemies: "Come help yourself." Of course the whole thing is somewhat akin to gambling, because the farmer risks everything upon one card, and if this wins, he is all right, at least so in his own opinion. But very frequently he is wrong, as the many exhausted and deeply mortgaged southern, western, and eastern farms tell us too plainly. But, at least as far as farming proper is concerned, do such things take place only away from home? Diversified farming would, perhaps, increase the number of noxious species of insects in any give locality, but it would not permit any one species to become too numerous to be successfully combatted.

The introduction of noxious insects from foreign countries into new regions also occurs from time to time, but is only likely to take place at or near our Atlantic and Pacific coasts. Such introduced insects, if suited to our climate, usually spread very rapidly and almost without hindrance, for the simple reason that their insect enemies have not been brought over at the same time. It frequently takes a number of years before our friends amongst the native insects take hold of the newcomers, and not until then is their further spread and increase more or less checked.

NATURAL METHODS TO CHECK NOXIOUS INSECTS.

We have to consider two well established natural laws, which counteract each other and struggle for supremacy. This struggle is so bitter that neither pardon is asked nor given. Nature seems cruel, but she is forced to be so by inflexible laws, and as the result are solely for the benefit and advancement of all the members composing the animal and vegetable kingdoms, we can only admire these methods. The two conflicting laws are: "Be fruitful and multiply," and "Struggle for life?" If the former law had full sway, pandemonium would soon reign supreme. The second natural law acts as a wholesome check upon it, keeps any unlimited increase of specimens in due bounds, so that only the fittest animals and plants can survive and reproduce. Suppose a single female oyster could multiply without any natural check; a very few years would suffice to fill up the Atlantic ocean with oysters. If a single female herring should reach the mature age of ten years, her offsprings during that time would not alone increase beyond any computation, and would not alone fill up all the oceans, lakes, rivers and creeks, but would bodily crowd her to the top of mountains. What would become of the stately oak if all the acorns produced by it should grow into trees? They would furnish enough wood to build a dozen Chinese walls around the globe, high enough to hide the highest mountain tops. But as it is, the law: "Struggle for life" quietly steps in and allows only the strongest and best adopted offspring to continue the species. The "Survival of the fittest" is the necessary and all important consequence.

As soon as any noxious insect becomes unduly numerous, its enemies will increase as well, and most frequently at a much quicker rate. This is easy to explain, because instead of the previous scarcity of food that now abounds, and the parasitic insects, well fed, are now not required by necessity to search carefully and for a long time for their prey, and for the food for their offsprings. They find such food in abundance in their close proximity. Thus at last the moment arrives when the plant feeding and parasitic insects are nearly equally numerous. Now the parasites soon consume their hosts, and but few of them escape this general slaughter. But as soon as this happy condition of affairs takes place (happy at least for the fruit-grower), the parasitic insects in their turn have to suffer and die simply because there is no longer food for them and for all their offsprings. The few escaping lucky insects, both of the host and the parasite, gradually and slowly increase again in numbers. There is truly an "up and down" in the life-history of every insect.

For the horticulturist it is very important to know the differences between his friends and his enemies. But it is not a very easy matter for him to acquire this knowledge as there are immense numbers of different kinds of insects around him, which either belong to his friends and enemies or to indifferent insects—insects which, as far as he is concerned, are of no special importance to him.

Our best friends among parasitic insects occur in the orders: Wasps and Flies (Hymenoptera and Diptera). Those of the former are often called Ichneumon-flies, being compared with the well-known animal of that name, which is said to enter the throats of crocodiles to devour its eggs. Of course it requires a very strong constitution to swallow the story, antique as it is. *Ichneumonidae* among insects are very small wasps, usually of a bright and metallic color, which deposit their eggs in other living insects, but usually in the caterpillars, although the other stages of insects are by no means free of their attacks. These eggs hatch in time, and the maggots thrive inside their hosts, eating at first the fatty substances, later the vital organs as well. At least so the books tell us; but in fact they simply eat the softer parts first, simply because they are not as yet strong enough to devour the harder tissues until reaching maturity. When full-grown they either leave the dying host, or spin inside of it a tough silken cocoon, inside of which they transform to pupæ, and later to perfect insects, which leave their prison to enjoy life in less crowded quarters. Most of all insects known are infested with such parasites in the one or the other of their early stages. Even their eggs, small as they are, are large enough to give food and shelter to some *hymenopterous* insects of correspondingly small size.

Among the *Diptera* or Two-winged Flies we have also some very useful friends. Chief among them are the Tachina flies, which resemble our common house-flies, but are decidedly more useful. These parasites glue one or more eggs to their victims, usually caterpillars, from which footless maggots are soon hatched, which devour the whole interior of the host upon which they were born.

Of great assistance in this bloody war, a war of extermination, which is constantly going on in a silent way, at least to us huge bipeds, whose ears are not sensitive enough to hear the groans of the victims, birds, animals and reptiles, most, if not all our insectivorous birds and animals should be carefully protected; so our reptiles, providing they possess no poison. There is a great deal of superstition about many of the animals found in a wild state upon our fields and gardens; this superstition is mainly based upon the fables of a former and less enlightened age, and is but slowly disappearing under the knife of dissections made to prove beyond doubt upon what such animals subsist.

But the program of this evening calls for another paper: "Insects injurious to small fruit."

I have been unable to devote as much time to insects affecting small fruit as I would like, chiefly on account of having been away fighting grasshoppers in a region where horticulture is simply a name, not a fact. Still I always devote as much time to fruit of all kinds as I can, providing the fruit is ripe. Yet, what I have observed in Minnesota clearly shows that our horticulturists have their full share of noxious insects. I have gathered together in one small box, which is now before you, all the species of insects injurious to these plants that I have found thus far in our state. They are few in number if compared with those found in other

states, still there are enough to occupy much of the time of the fruit growers to fight and to get rid of. I have not made any attempt in this small collection to classify the specimens according to their food plants, as all of them occur upon plants of currants, blackberries or raspberries. Some of them prefer the one plant, others the other plant, but all are distinguished by being very injurious. By very injurious I do not mean to express that they are all always injurious. In most cases, when not numerous, they occasion but little damage, and this is easily overlooked. But this should not be the case! All of these insects, if favored by conditions which are beyond our control, can very soon become exceedingly numerous, and consequently injurious in proportion. So it behooves us to take time by the forelock, and to "remove them from office for cause or otherwise." An ounce of prevention is always better than a pound of cure. None of these insects should be allowed the freedom of our gardens and fields. Yet very few of you have ever seen the insects as displayed in the box, because in this their perfect or winged state they are either nocturnal in their habits or so small and nimble as to be readily overlooked. But you have no doubt seen them all in their earlier stages as caterpillars or slugs, or have seen their "trade-mark" upon leaves and stems. Every grower of the plants under consideration should make it a rule to visit them as often as possible, and he should never fail to hunt for caterpillars, to catch and dispatch them in any way he sees fit, providing it is a way that permits of no resurrection. No arsenical poisons should be used, if it is possible to get along without them. It so happens that most of the insects upon such plants that can be reached at all by poisons are double-brooded, and as the second generation is most frequently the injurious one, poison may later be used with advantage, as under the conditions then prevailing it will only be used after all the fruits have been gathered. But here lies one serious trouble: the plants without fruit have lost most of the interest they possessed earlier in the season; they are not inspected so often and so thoroughly as formerly, and thus many insects thrive and increase without hindrance, which—although not able to destroy the crop of that year—are only too apt to do so during the following season. Constant vigilance is the price of success, in fruit-growing as well as in any other business.

During the season of 1889 the following insects proved the most injurious ones, and specimens of their work were often received and found by me. The letters received with them plainly indicated that all these insects occur almost everywhere in the state where such plants are grown to any extent.

The Raspberry Flat-headed Borer (*Agilus ruficollis*).

The Snowy Tree-cricket (*Ecanthus niveus*).

The Imported Currant Stalk-borer (*Ageria tipuliformis*).

The American Currant Stalk-borer (*Psenocerus supernotatus*)

The Buffalo Tree-hopper (*Ceresa bubalus*).

In many cases the canes received showed the work of at least three different insects, all more or less injurious. But by all odds the most injurious one was the Raspberry Borer, or the Red-necked

Agrilus (*Agrilus ruficollis*.) (Fig. 1.) This insect is a beetle, and belongs to that large family of beetles whose larvæ are so well known by the name: "flat headed borers." Most horticulturists in more southern states know to their sorrow how injurious the flat-headed borers of the apple tree may become in certain years and in certain localities. Nor is this insect a great rarity in this state, where it occurs quite commonly in oaks. The

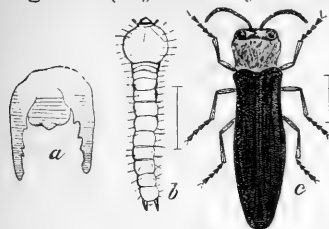


FIG. 1.

Red-necked *Agrilus* possesses the faculty of producing peculiar gall-like swellings upon the canes infested by it. (Fig. 2) These galls have received the name Raspberry Gouty Galls, from the fact that the stems swell up in particular places as if troubled by the gout yet this is not always the case, as I have frequently bred the insect



FIG. 2.

from canes that had been killed by them, yet showed no perceptible swellings. The illustration before you shows such a gall. The cane, instead of being smooth and of the same color as the healthy parts, is swollen, and is further distinguished by many short, rough, longitudinal slits. Numerous ridges may also be seen, which run round and round the axis of the cane. If, during autumn or spring, we cut into such ridges, and follow the burrow underneath, we find under each a little yellowish-white larva. This larva is distinguished from other larvæ occurring inside the cane, by having the body much flattened out horizontally. Its small head is retractile, and has brown jaws; a tail furnished with two long and slender dark brown thorns, as indicated in the illustration, is also quite characteristic. The size of this larva, if full grown, ranges from one-half to three-quarters of an inch. As the larvæ burrows exclusively in the sapwood, it frequently girdles the cane, thus killing it. Each gouty gall contains most frequently a number of such larvæ, and some of the canes investigated contained as many as seven. Towards fall the full-grown larva penetrates into the pit, where early in spring it transforms into a pupa.

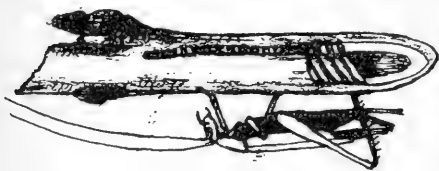
The winged beetles appear at about the time that raspberries and blackberries are in full bloom. They now mate, and soon afterwards deposit their eggs for another generation. These eggs are laid in or upon the young canes, and the young larvæ soon after produce other gouty-galls. The beetle is a slender and rather pretty insect. It is characterized by a brilliant coppery color upon head and thorax. Its body and hard wings are velvety black.

These borers infest both raspberries and blackberries, but rather prefer some of their numerous varieties.

The remedy is quite simple, because we understand the whole life history of this insect. The infested canes must be cut and burned before the beetles hatch. They must not be simply cut and left upon the ground, as is too often the case, because in doing so we protect the insect against the inclemencies of the winter, or otherwise assist it. The canes must be burned to make sure of the death of the enclosed larvæ. It is also quite important to treat all wild plants of such berries growing in the neighborhood, in the same way, as otherwise new supplies of beetles will constantly reach the cultivated plants. The beetles like to bask upon the leaves in the hottest sun of noon. By holding an inverted umbrella under the plant, and by striking the plant a sharp blow with a stick, large numbers can be collected and killed, as the insects drop upon the slightest provocation. By using an old umbrella the operation can be greatly simplified if it is kept soaking wet with kerosene oil, which, owing to its very penetrating qualities, kills all insects coming in contact with it.

This is a new remedy, never published before, but a very good one, as I found by many trials during the last two seasons. Not alone for this insect but for many others equally injurious to these and other plants. By having the inside of the umbrella lined with some porous material, which will retain the oil, it is greatly improved.

The eggs of another insect were also frequently found in canes received and observed in the fields. The life history of this insect, the Snowy Tree-cricket (*Ecanthus niveus*,) is illustrated upon the canvass before you. As the illustration (Fig. 3) shows, it is not the



(FIG. 3.)

insect itself that is injurious by eating the plants, or parts of them, but the habit of the female in using the canes for oviposition causes the damage, which is frequently very severe. The cane containing eggs is more or less

disfigured by a series of irregular and closely set punctures. If we open such a cane we find in the pith a large number of eggs. Each egg, pale yellowish in color, is a little curved affair, pointed at the lower, and capped at the upper end with regular granulations, only visible with the aid of a magnifying lens. Of course the presence of such eggs, crowded together as they are, causes the cane to die above the injured part. These eggs are laid late in the autumn, and cannot be discovered very readily at that time. But as the young crickets hatch rather late during the following spring, the place of oviposition is readily discovered by the diseased looks of the cane, and a pruning knife will soon remedy the evil. But the canes must be burned to prevent the hatching of the young insects. Although these latter themselves are rather beneficial, by feeding on leaf-lice, we must not allow them to increase, as other canes, for instance those of the grape-vine, and even tender twigs of fruit trees, are also seriously injured by them.

Another insect, the Buffalo Tree-hopper, is also illustrated upon the canvass. This is a comical looking triangular affair, trying to look like a ferocious buffalo, but lacking the size to inspire alarm.



Fig. 4.

This hopper (*Ceresa bubalus*) belongs to the order hemiptera, sub-order homoptera. In describing its personal appearance we might say: a very green looking object, mottled with brown dots, one-third of an inch long, very active and apt to jump away upon the slightest provocation. It is very shy, and if it knows that we observe it it will immediately hide behind a branch, or vanish by means of an extraordinary powerful jump. By looking at this creature the origin of its name, both of the scientific and popular, becomes self-evident. Yet this insect (and two others closely resembling it), small as it is, becomes sometimes very numerous, and injurious in proportion. Like all true bugs it absorbs the sap of plants by means of a rather long and sharp-pointed beak, thus injuring the plant. But the chief damage it causes is by laying its eggs in canes or twigs. They are punctured in a peculiar manner, as shown in the illustration. The young insects which hatch from these eggs are even more ridiculous looking things than their parents, as may be seen in the illustration and in the specimens before you in the box. As the insects themselves feed only by means of a beak, any application of arsenical poison is of no avail. The careful removal of their eggs and the use of an oiled umbrella is in most cases sufficient to keep them in check.

There are two other insects which often cause great injury to the canes of currants. Both are common in Minnesota and require strict vigilance to keep them under control. Both are illustrated by figures and specimens. They are cane-borers of the worst kind, though very dissimilar in general appearance.

The Imported Currant-borer (*Ægeria tipuli-formis*) is a very beautiful insect when quite fresh from the pupa. It is a moth, but does not greatly resemble such an insect, but looks more like a wasp or a long-legged fly. When flying, which is indulged in during the hottest parts of the day, this insect would not be taken for a moth at all. Still its beauty is but skin deep, as the ornamenting scales drop immediately when touched, and it is after all but one of the worst pests of the currant in a gaudy dress. The larva and pupa are shown also in the illustration. Both resemble very closely the



Fig. 5.



Fig. 6.

early stages of the peach-borer, an insect not found in any great numbers in this the Banana-belt of Minnesota. The larva, which is yellowish white, of a cylindrical shape, is distinguished by the possession of a dark-colored head and legs, and differs in this respect from the larva of our native currant-borer, which lacks all traces of legs. When full grown, and before changing to a pupa, it eats

a hole or passage way nearly through the cane, leaving simply a thin film to hide it; this is very necessary as the delicate moth, lacking biting mouth-parts, would not be able to reach the light of day. The larva burrows in the centre of the cane, feeding all through the summer upon the pith. The tunnel thus made measures several inches in length.

The Native Currant-borer (*Psenocerus supernotatus*), is the larva of a rather fine-looking beetle, which has dark brown wing-cases ornamented with white spots, as seen in the illustration and specimens. (Fig. 7) It is not a very active insect, is seldom seen, and can only be obtained by beating the plant over an inverted umbrella. Its small, white, cylindrical and footless larva, with a brown head and black jaws, is also shown in the illustration, as well as the pupa. Many such borers are usually found in the same cane, where they feed upon the pith. The larva belongs to the round-

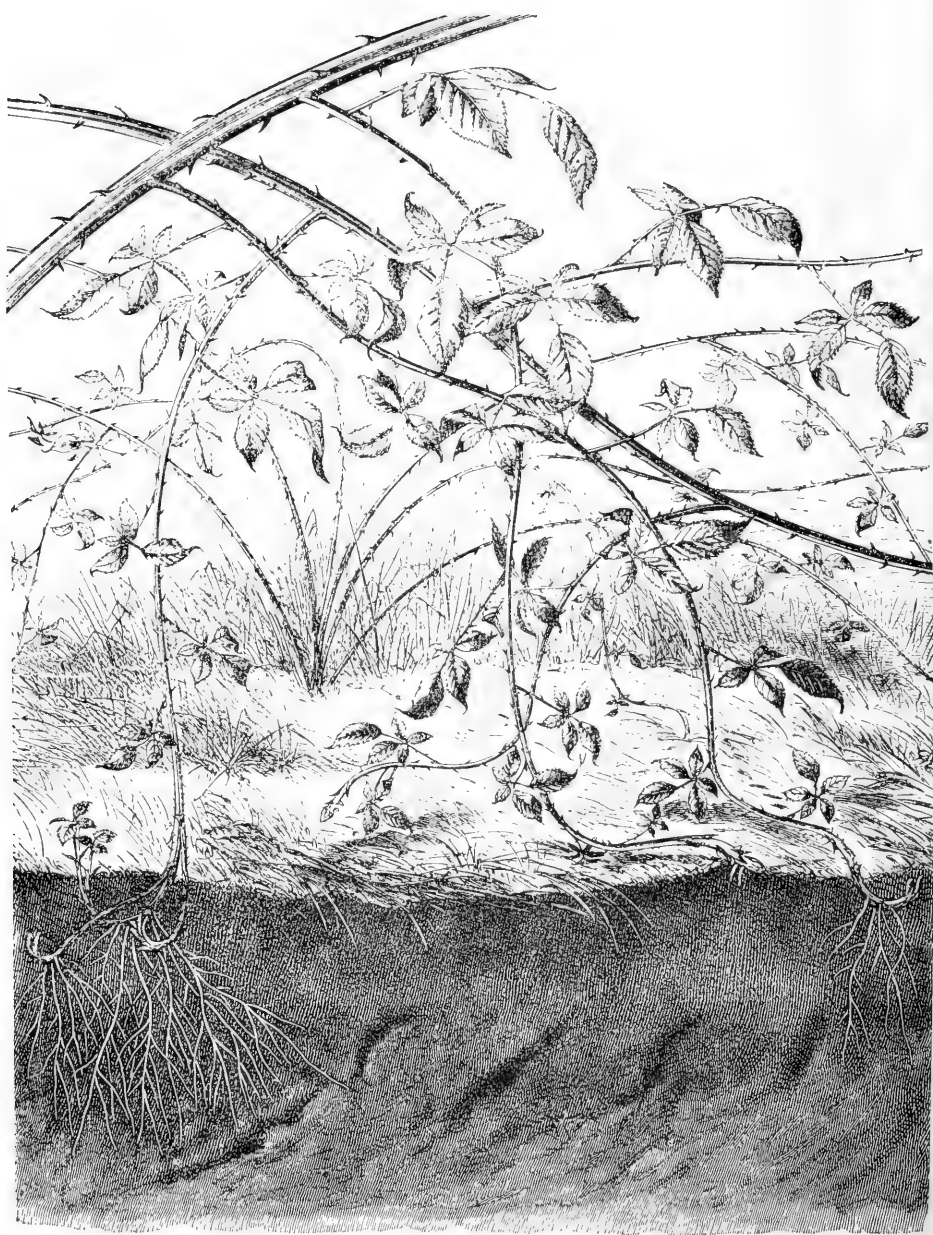


FIG. 7. round-headed borers, whose injuries are frequently very great in apple orchards.

All these boring insects must be removed with the pruning knife, and be burned at once. This is a rather heroic treatment, and might well be modified, if the fruit-grower has the necessary time. He ought to consider that most, if not all of his insect enemies harbor parasites, which he cannot see. By burning cane and inhabitants he not alone kills his foes, but his friends as well. To protect the latter he should not burn the canes at once, but put them in fairly tight boxes, covered on top with a coarse screen. This would enable most of his friends, the parasites, to escape and to carry on the good work in garden and field, far better than any human being could do. Later the canes could be destroyed, and with them the enemies still in them or collected in the box, which they could not leave on account of their greater size. Of course in the case of the tree-cricket and buffalo-hopper this precaution would be of little avail, as the insects hatching from the eggs inside of the cane are too small to be made prisoners by a coarse screen. But if the boxes with infested canes were kept in the barn, away from any fresh food, these young insects would perish before reaching their food-plants; the parasites, on the contrary, being mostly furnished with wings, and needing little or no food, would soon find their way back to infested fields.

Looking at the box filled with insects injurious to his fruit the grower of these important plants will no doubt notice one thing: without labor no fruit can be grown successfully for a series of years.

O. L.



RUBUS BIFLOUS

PECULIAR ACTIONS OF SOME BLACKBERRY ROOTS.

By Prof. Otto Lugger, Ph. D.

There are many methods in which plants protect themselves or their offsprings against the severe cold of winter. Some species of wild blackberries are very interesting in this respect, and as some of the members of the Horticultural Society may be interested in such botanical investigations, the facts in the case are here given and illustrated:

Rubus bifrons, one of the species of blackberries, is shown on the plate. In this case the ends of the branches are actually pulled below the surface of the soil; this is shown in the illustration, by having removed the soil in such a way as to expose the tips of the branches, and the roots proceeding therefrom. This plant produces annually strong five-sided shoots, covered with thorns, all pointing backwards. These shoots grow at first in a perfectly straight and perpendicular direction, but towards autumn they gradually bend more and more, until they form at last wide arches, and thus the tips of all shoots come nearer and nearer to the earth. Before such tips have reached the soil, however, we can notice near the base of small, scale-like, and dwarfed leaves little swellings upon the edges of the stems, which, when investigated a little more in detail, prove to be the starting points of roots. As soon as a tip of a shoot has actually reached the soil, these root-germs come in contact with it, and immediately commence to grow and soon penetrate into the same. Here they elongate and grow rapidly in size, numerous lateral branches are formed, and in a very short time quite an extensive system of subterranean roots is produced, as indicated in the illustration. But even the tips of the shoots, from which the roots started, have been pulled beneath the soil as well, and they now look quite fleshy and thickened. These tips were pulled beneath the soil by the action of the roots, and moreover remain embedded there. In the following spring, and frequently already during a very favorable warm autumn of the same year, these tips, nourished by their own new roots, commence to grow, and soon form new plants which appear above the soil. The old plant which produced such arched shoots, dies sooner or later, and only the tips remain as new and independent plants.

But how can the roots pull such shoots below the soil? And there is not the slightest doubt that they perform this work. The explanation is not a very difficult one: when ceasing to grow the roots shorten, and in some cases this contraction amounts to nearly one-third of the whole length. This shortening is produced by a change in the turgidity in the cells during the absorption of water. Whilst the cells of growing roots elongate by increased turgescence, those of mature roots become shorter and broader with an increase of turgity. It is indeed strange that in a mature root the parenchyma cells during absorption of water, and an increased turgescence, are made broader, and this at the expense of

their length; the natural consequence must be a shortening of the whole tissue. This shortening of the fully mature roots acts in all directions as a pulling force. At the lower end of the mature root we still find an immature part, the growing piece of the root which is trying to penetrate deeper and deeper into the soil; at the upper end we find the mature part from which the roots started. The lower and still growing end or tip of the roots is covered with hair-like sucking cells, which are closely united with the surrounding earth, and thoroughly imbedded in it. This end therefore has assumed a fixed position which cannot be overcome by the pulling actions of the part of roots above. The growing part of the roots is stretched by an elongation of the cells, and yet the tips of the roots can enter deeper and deeper into the soil notwithstanding the pulling actions above. The power exerted by the shortening of the cells can consequently not act in this direction, or downward, but must act in the opposite direction, or must pull down the tips of the shoots, since here there is no opposing force, as nothing is held securely in position, and in this way the tips of the shoots are actually pulled below the surface of the soil.

Such remarkable cases, in which parts of plants are pulled below the surface of the soil can only be found in such species, in which the roots grow in a perpendicular direction into the soil, and is most common in such that store up food in the subterranean tissues of their stems or roots. Roots, which grow in a horizontal direction, are not apt to act in this manner, but on the contrary may even—under certain conditions—lift the stem above the soil. Of course in species of blackberries which thrive in extremely cold regions this method of wintering is a very beneficial one, as the plant is thus not alone enabled to multiply, but is also enabled to secure all the important substances still remaining in the dying parent plant, and to store them away for future use. The offsprings of the mother-plant remove everything, that is no longer of any use to the doomed plant, below the soil, and thus store it in a place where the cold of winter will not injure it, and where they can make use of it for their own benefit.

INSECTS AND HORTICULTURAL NOTES.

By R. J. Mendenhall, Minneapolis.

To the experts of today our remarks may not be very scientific, for we confess we have not kept abreast with the subjects of botany nor entomology, having some years ago become discouraged by the vastness of the fields; nevertheless, we will pen a few thoughts.

The contempt with which the Insectarian is looked upon, not only by the old-fashioned farmer himself, but by even the more intelligent masses, is, to say the least, very amusing.

In the preface of that admirable and highly interesting work, Kirby & Spence's *Entomology*, (and by the way we shall draw a

measure of what we may say of entomology from them). In this work they say one cause of so little attention being paid to entomology is the ridicule so often thrown upon those who pursue the study of insects. This is not, exactly so, however, with the botanist, who, sheltered now by the union of his study, medicine, may dedicate his hours, yes, his best life, to the study of a few mosses and lichens without the least whisper of ridicule. In the minds of most men, the learned as well as the unlearned, the idea of the trifling nature of the pursuit of the entomologist is so strongly associated with the smallness of the objects that his very name is synonymous with childishness.

If we pursue the study for mere self-gratification, we often feel or wish that some one would enter into our views and feelings and so confirm us in the opinion that we entertain of ourselves. But when or how can we look for sympathy, or a fellow feeling, when our calling is unknown to the world, except as indicative of littleness of mind? Mankind in general, even philosophers seem to deprecate any calling or profession, except the particular one they have made their own. And, yet, we cannot say much against this, for we are all more selfish than we think, or even pretend we are. So in such contests for prominence, there is no science that has come off worse than entomology.

Her students have been few and her admirers less, but, notwithstanding all this, we are satisfied. We could, if we had the time to dive deep enough, easily demonstrate to all minds, that were it not for the existence of insects—entomology—there would be no botany, no bread—from this you can draw your own conclusions, and vice versa.

Now, in endeavoring to get at the true status of any department of science, it is necessary to compare it with other branches and thus determine its standard, the instruction and amusement it affords to its pupils, as well as the benefits to be derived from it by society at large. While not in the least speaking disparagingly of any branch of science, or more specifically natural history, we nevertheless maintain that the economic study of entomology and the practical application of its teachings to the wants and demands of society, makes its study pre-eminently useful above all of its sister sciences.

As to the number of specific objects, entomology caps the climax, there being more than 400,000 distinct species of insects, while for all other animals 30,000 would be an excessive estimate. There would seem to be no end to the testimony we could bring to prove that the study of entomology is the one thing to do, and why it is not taught in our schools, colleges and universities, is what we are unable to comprehend.

To advert a little to the beauties of the insect world, let us refer to a few of the markings with which nature in her sportive mood has painted them. Upon some we have imitation of the clouds of heaven, meanderings of rivers, many are veined like beautiful marble, others resemble a robe of the finest net-work, some are blazoned with heraldic insignia, giving upon fields of sable, azure,

vertigules, argent, or fesses, bars, bends crosses, crescents, stars, and even the outlines of animals. Think of the Death-head moth, and others that we might mention. There seems to be no end to the shapes and colors with which these tiny creatures are favored, and how they act and what imitators they are. Almost every farmer's son is acquainted with the snapping-beetle—*elater*—that comes into the window summer evenings, darts for the lamp, strikes its head against the shade or chimney and so falls on the table on his back, but by some queer contrivance of his head and neck he soon flops over and away he runs.

We wish it were possible to say something that would entice some of our boys to study this wonderfully interesting subject. Who knows but a Linnæus or a Cuvier, or an Agassiz lies hidden under the rough exterior of some of our farmer boys, all they may lack is a little direction. We feel sure if we can once get a boy interested in the structure, moultings, transformations, metamorphoses, egg hatching, feeding, growth, etc., we have laid the foundation for a close observer of nature, and that is just the very thing we wish the future horticulturalist to be. Why! this subject enlarges before the view of our mind and we cannot grasp a tithe of its beauties or its usefulness!

We spoke of the actions and imitations of some insects. There is a spider in the island of Sumatra and Borneo, that by its wonderful instinct, weaves a thin webb on the leaves of some plants, in the shape and resemblance of the droppings of a bird; it so weaves the web that it is thin in some places, leaving blank space and thickened in some places even like a drop running down the edge of the leaf ending in a little pellet close to the end and making the whole thing look for all the world like the excreta of a bird dropped on the leaf. This spider has his body black and his legs white and black, so after he has finished the trap, he, possum like, is himself up on his back and awaits the arrival of some hungry insect that feeds upon the excretia of birds, and so dives down to make his meal, when lo! it furnishes a repast for a turn-coat.

Many, indeed, are the examples we could give of the actions and imitations of these creatures. There is a species of a butterfly in Brazil, upon which a certain bird feeds; this is a curious thing. There is another butterfly somewhat similar, but not of a pleasing taste to this bird. So it is said that the palatable butterfly actually follows not only the habit of flight, but imitates the coloring of the distasteful lepidoptera, and thus escapes. Insects are tent-makers, miners, millers, weavers, carpenters, painters, agriculturists, undertakers, and some of the mites and spiders are the most wonderful acrobats.

They are ubiquitous, and infest the whole animal creation—they are on your head, in your mouth, on your body and in your stomach, and in your heels, and so likewise they infest the whole vegetable creation.

The remainder of our remarks must be few, for we have already exceeded our limits.

The plants that are mostly cultivated in greenhouses are, roses,

lilies, carnations, chrysanthemums, geraniums, pansies, heliotrope, primula, verbenas, fuchsias, pyrethrum, smilax, violets and others. The proper description of the cultivation of these would require much space to each one, but every one of these different plants are under favorable conditions preyed upon by a particular insect. To describe each one of these and their habits, would be entirely beyond the limits of this paper. We will, however, refer to a few of them: A plant in its normal condition, that is, a perfectly healthy plant in its habits and in the field of its proper environment, is seldom attacked by insects, until it has reached a certain condition. But this is not universally true of all vegetation, but we cannot go into an explanation of the why and the why not. But it is quite apparent to all close observers of nature.

The rose is mostly subject to the attacks of the green aphid, red spider, and under certain conditions, the mealy bug. All three of these insects likewise attack the lily. Of course there are many insects that feed upon the rose and all of the plants that we have mentioned, when grown out of doors. But our remarks concern, now, only greenhouse plants, and the insects that injure them.

The green fly (*Aphis*), is easily removed by timely use of tobacco smoke. The red spider (*Tetranychus telarius*), scientifically speaking, is not a spider at all, but a mite—a spinning mite. You all know a spider is constricted just back of the thorax, like unto a wasp, but our little fellow is universally called the red spider, and we adopt that cognomen. He, or it, is very difficult to remove from our plants, indeed, not infrequently the plants are almost ruined before we are aware of his presence. His favorite environment is in warm, dry air. We do not like to believe in spontaneous life, and yet, it does seem as if we are almost daily confronted with the fact, for we send our plants out free from the red spider, and in a few days we are buried under complaints from our lady friends, that their plants are sickly and leaves are yellow and brown, and falling off. We know at once the cause, the hot air in a dry, close room, the very nest of the cause. It is useless to argue with our lady friends, for they know better—their rooms are not hot nor dry, and so we try to appease them with a sweet rose-bud, or a bunch of violets.

The best remedy, and in fact the only one, is by copiously syringing the plants with water, as well as the benches and walks in the greenhouse; also, the hot water pipes. If this is done and persisted in—you need not fear but the spider will be drowned out. But to describe our little Turk, it is found on a great variety of plants, as it is as varied in its colorings as the plants upon which it feeds, some are greenish marked with brown spots upon their sides, others of redish and somewhat lustrous. In fact, to view them with a microscope, in variety of colors they resemble a herd of cattle or spotted swine. The legs of these mites are wonderfully adapted to the drawing out the flimsy thread with which they spin their fine web-net work under which they live, on the underside of the leaves, from which they suck the sap, and to stretch their webs, their feet are used, and made to perform very rapid motions.

It is considered by some a good plan to place sulphur upon the pipes, but there is nothing so good as thoroughly spraying the plants, as these pests cannot endure moisture.

The worst pest which we have to deal with is perhaps the ver-bena mite, its mischief is not alone confined to the ver-bena, but its ravages may be seen on the petunia, pelargonium, heliotrope, and on many outside plants and trees as well as a great variety of Greenhouse plants. It is so insidious, that it is almost impossible to cause its surrender, Tobacco might be effectual, but the creature buries itself so into the substance of the leaf or bark, that the fumes of tobacco seem to have no effect. We are inclined to the opinion that dipping the plant into a weak decoction of fir oil and water would very materially aid in their depletion.

The carnation twitter, mealy bug, scales, etc., as well as the black aphid that so injures the buds of our chrysanthemums, and a host of other insects which we will not attempt to describe, can be kept in check, more or less, by the various remedies that are advertised for the purpose, and notably fir oil.

We cannot close without again referring to the fact of the vastness of the subject of entomology and the benefits to be derived, and the pleasure and entertainment to be had from the study and practical application of the results to the uses of humanity.

Permit us again to raise our voice in favor of having the subject taught in our schools, yes, in our common school. Let the teachers who go out to take charge of our common country schools be required to be well versed in entomology and let the county superintendents backed by our legislature, require that entomology be one of the studies to be taught, and no teacher be permitted to receive a certificate entitling him to be teacher, until he can stand a fixed examination on the rudiments of this science.

President Elliot. I think we owe a vote of thanks to these three gentlemen for these very instructive papers. They are very useful and give us a line of thought that I hope we shall not soon forget.

Mr. Grimes. I move that we pay our debts.

President Elliot. I think that we will all do that heartily.

The motion was seconded and carried.

President Eliot. We have with us here to-night a friend from Dakota, who quite a number of the older members of the society would recognize in the person of our former secretary, Oliver Gibbs. He has presented his credentials formally, and I wish to give him a hearty welcome and introduction to the members and audience here, and I hope he will favor us with a few remarks.

REMARKS OF MR. GIBBS.

Mr. President, Ladies and Gentlemen:

I thank you for the cordiality of your greeting. I have come a long way to meet again with this old Horticultural Society, and I

have anticipated a rich reward for the trouble I have taken to meet with you again. As I come this time as a delegate representing the horticultural society of the State of South Dakota, I will say, first, that we wish to thank you most heartily for the aid we have received through your liberality in allowing all our members to draw copies of your annual report. We have not as yet become equipped with public funds, or any provision for the printing of our reports. We have had nothing to offer our members who join with us except the Minnesota reports, and it has been one of the greatest means of keeping the Dakota society alive up to the present day.

We have been steadily growing in numbers, although our membership is still small. You all know how difficult it is to organize and keep alive a society in any new state or territory where it has not yet reached the period of recognition by the legislature. I will say here, that our membership at the present day, although only about twenty-five or twenty-six, is composed very largely of a most excellent class of horticultural workers. There are very few who are not capable of writing a good paper on some horticultural topic, and of contributing valuable matter in our discussions as we take our subjects up. I feel very proud of the material of which our society is composed, and see in the excellent qualities of that material, great hope for good work, that shall give us a large and influential society in the near future. We are now fully organized as a state horticultural society. Our society is incorporated, committees appointed and we have applied to the state legislature for that recognition which is given to all the horticultural societies in the neighboring states. We have no doubt that our legislature now in session at our capitol will give us provision for printing our reports and an appropriation for our expenditures. Hence we expect to be able to repay you, in part, in the way of exchanges for the liberality that you have extended to us and of which I have previously spoken.

We also expect in time to give you some benefit from certain lines in horticulture and forestry, that from necessity we are compelled to work out in that western district, in which you already, I see, are taking considerable interest.

I received from your president an invitation to contribute something on the subject of native shrubs and fruits. I will endeavor to do it at some other time.

We are coming to the conclusion, without wishing to discourage any of the lines of experiment in imported fruit, so to speak, that we have enough within the list of our native fruits to supply every household in that prairie country with delicious and wholesome fruits for the table. We begin to see how we can make those fruits grow in our gardens, and whatever may be the outcome of the higher class of fruits, we shall not be destitute of fruits, if we pay careful attention to such as we have. I will not take your time now, but as your sessions proceed I will do what I can to help your meeting along as I have occasion hereafter. (Applause.)

An adjournment was then taken until Thursday morning at 9 o'clock.

THURSDAY MORNING SESSION.

JANUARY 23, 1890.

The meeting was called to order by President Elliot.

Mrs. A. A. Kennedy read the report of the McLeod County Horticultural Society.

REPORT OF THE MCLEOD COUNTY HORTICULTURAL MEETING.

The McLeod Co. Horticultural Society held its fifth annual meeting at Hutchinson, Dec. 3, 1889, and was called to order by the president at 1:30 o'clock p. m. Minutes of last meeting read and approved, and the treasurer's report was read and accepted. The first topic for the afternoon was blackberry culture. Mr. Cutler was called upon to give his experience, which he did. Prof. Green thought it was not best to pinch back the laterals as it makes them more difficult to cover. The second topic was plums. The next was a talk on red raspberries, then a talk by Prof. Green on the different varieties of grapes raised on the experimental farm. He thought for Minnesota the three best varieties were the Victor, Moore's Early and Worden. The subject of apples was taken up and a discussion on strawberries followed.

EVENING SESSION.

Song by O. D. Hutchinson, Mrs. Hutchinson presiding at the organ. The President read his annual address. Mr. Urie, of Minneapolis, discussed bee culture. He gave an amusing incident of the old way of hiving bees, also valuable instruction to those interested in beekeeping; music by Mr. and Mrs. Hutchinson; essay by Prof. Green, describing the course pursued at the agricultural school. He urged the necessity of such an education for the coming farmer. Adjourned.

DEC. 4, 9 A. M.—Meeting called to order by the President. Mr. Urie gave a very impressive object lesson illustrative of the nature and habits of bees, and the best methods for their management.

Election of Officers—President, M. Cutler; vice-president, Wm. Tomlinson; secretary, Mrs. A. A. Kennedy; treasurer, Mrs. Annie Bonniwell.

Members Received—Wm. Robins and R. G. Benjamin.

AFTERNOON SESSION.

Meeting was called to order by the president. A letter from Mr. Wilcox, of Hastings, was read. The next was a five minute talk by the president on the care of small fruits. A motion was made and carried that Messrs. Green and Urie be made honorary members of our society. A vote of thanks was tendered these gentle-

men for their presence and instructions. Mr. Urie thanked the society for the manner in which he had been entertained during his stay in Hutchinson. The place for holding the next meeting was left to the executive committee. Adjourned.

MRS. A. A. KENNEDY, *Secretary*.

REPORT OF THE MINNESOTA VALLEY SOCIETY.

GRANITE FALLS, MINN., JAN. 17th, 1890.

S. D. Hillman:

DEAR SIR.—The past season has been a very discouraging one to the fruit grower and the gardener. The reasons for this discouragement are not to be sought in any peculiar characteristics of our climate, but in that condition which is liable to occur anywhere—drought. We did not have the usual spring rains, and received only a few showers through the summer, so there was not sufficient moisture to perfect plant and fruit. Strawberries were almost an entire failure, and none of the small fruits produced more than a very light crop. Grapes yielded more than any other, but these were not abundant. Apple trees have blighted so badly for two years that planting has largely ceased in this section. The currant worm continues his depredations upon our gooseberries, so it is only a question of time when we shall have to wage unceasing warfare upon this pest, if we will raise gooseberries or currants. The early drought prevented the germination of seeds to a certain extent, and held back the small plants from making growth, so that garden products were below their usual standard in quantity and to some extent in quality also.

I think the growth of wood and vine was well perfected in the autumn, so that although it was not large, it presents good conditions for fruit the coming season under favorable conditions.

Yours truly,

O. E. SAUNDERS.

President Elliot. We have a report from the Southern Minnesota Horticultural Society, and as it is quite a lengthy report, I don't know but that there may be some meat in it.

REPORT OF SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

The Southern Minnesota Horticultural Society held its third annual winter meeting at the council chamber, Jan. 7, 1890.

Among the prominent horticulturists present from abroad were Mr. O. M. Lord, the plum specialist, of Minnesota City, and Mr.

J. S. Harris, of La Crescent, Minn., the well known horticultural lecturer. The largest apples upon exhibition were the specimens of McMahon's White, raised by Mr. Sidney Corp, of Hammond's Ford, Minn. These apples were very large and beautiful, and attracted much attention. The color is very light yellow, or straw color, almost white. The shape slightly oblong. They excelled in appearance most of the apples offered for sale by our city dealers during the past season. From five trees Mr. Corp raised this season 10 bushels. The trees were bought of Mr. Sias, of this city a few years ago.

The N. W. Greenings exhibited by E. W. Daniels of Aurora, Wis., were very fine.

The Orange Winter, a seedling from A. C. Tuttle, Baraboo, Wis., is a medium sized, showy apple of fine quality. Mr. Tuttle also exhibited two hardy Russian varieties, the Zusoff and the Getman.

The apple that attracted the most attention, however, was a cross between the wild crab growing near St. Louis, Mo., and common apple. This cross originated with Mr. C. G. Patten, of Charles City, Iowa, and is the first occurrence of the kind ever known. In his annual address Pres. Sias referred to this, and said that in his opinion the coming apple for this country would be developed from our native crab apple. For if a cross had been obtained once it could be had again. The crab apple trees are among the most hardy that grow. They never sun scald. Their hardiness, with size and quality of fruit, would give us just what we need. His address brought out considerable discussion.

Mr. Harris offered the following resolution:

Resolved, That the State Horticultural Society be requested to offer six dollars as premiums for the best exhibits of crab apples.

The resolution was passed. Mr. Harris said the premiums would direct the public attention to the crab apples, and would show in what part of the state the best ones could be found. He believed Pres. Sias was on the right track. He remembered that the peach was once a bitter almond, the pear a small hard fruit unfit to eat, the tame plum a smaller and poorer fruit than our wild Minnesota plums, and that the Concord grape was but three generations from the wild sour grape. He believed that garden cultivation alone would improve the crab apple.

Mr. Lord said that here was work for the experimental stations. He believed himself too old to undertake such a task, but saw no reason why a large apple of good quality could not be obtained from our wild crab in time.

Mr. I. D. Swain said that with the apple before him, which had already been obtained, and which we had all tasted and found good, the future looked promising.

Mr. Geo. E. Campbell said that if in one cross such a good apple was obtained, it would not take so very many years to get our apple.

Mr. Hoag thought that an apple as hardy as our wild crabs, and of good size and quality, would certainly be better than any variety that we now had. Mr. Sias' way seemed to be the practical way to get a good apple.

Mr. O. M. Lord read a paper entitled, "Are Native Plums a Failure." This paper should be read by every farmer.

F. W. Loudon, the originator of the Jessie strawberry, sent a paper in which he told how he manured his ground for strawberries. Thos. Frankland sent a paper entitled, "The Wild Fruits of Manitoba."

Dewain Cook, of Windom, made a report of the fruit crop of 1889.

Mr. Harris then delivered his "Talk upon Apples." He said that apples were of more value to a country than potatoes. The human system in this country demanded an acid, which no other fruit can supply as well as the apple. Men who don't eat apples drink whiskey. An Irishman worked for him a few years ago, and Mr. Harris thinking that Irishmen never ate anything but potatoes, cooked a half a peck of Talman Sweet apples, which he raised that season. On the second day the Irishman said: "You can keep the potatoes; I'll take the apples." He said that we already have some good hardy apples, but we wanted more and better ones; for we are a little better class of people here in Minnesota, and want a little higher grade of apples than they have East of us, and we will have them in time. He described five new apples which he had lately seen in Wisconsin.

"A Few Words about Annual Flowers," is the title of a paper presented by Wayland Stedman.

Mr. Lord said that he had always greatly admired flowers, and liked to see them on every farm. He thought asters were a grand flower.

Mr. Swain believed in flowers, had cultivated them for years, but liked bulbs on account of the little care they required. His Roman hyacinths had been in blossom since Nov. 1st. The other hyacinths were just now opening. He had a large lot of hardy bulbs growing in his yard.

Mr. Harris then read his paper, "Horticulture for Farmers." This valuable paper was placed on file for publication.

The secretary was appointed as a committee to consult with fruit exhibitors and find how many plums, apples, grapes, etc., ought to constitute a plate and to report to the secretary of the fair association.

The election of officers resulted as follows: Pres., A. W. Sias; Sec. and Treas., Wayland Stedman; Vice Pres., J. S. Harris; Ex-committee, M. J. Hoag, I. D. Swain and Geo. E. Campbell; Delegate to state society, I. D. Swain.

The treasurer's report showed that 27 members paid dues in 1889. There is now a balance of \$9.34 in the treasury.

Mr. Gibbs. A number of years ago this society removed the Transcendent from its list of fruits for general cultivation on account of the general experience in the older settled portions of the state in regard to its blighting. The next winter, I think it was, the Transcendent was put back on the list and recommended for districts not subject to blight, because reports had come in from

the Southern part of the state, that, up to date, the blight had not appeared there, and many believed there was something in the soil and climate there that would free the Transcendent from blighting. Now enough time has elapsed to determine that matter, and the inquiry I wish to make is: Is there any district in Minnesota where the Transcendent crab has been in bearing more than two years and where it does not blight?

President Elliot. I do not know what the experience is with growers in late years, but when we first began to cultivate the Transcendent we had no trouble about its blighting until it got to bearing size, not until the year that we had blight on everything, then it was through nurseries and everywhere; but when it first commenced my recollection is, it commenced in the older trees.

Mr. Grimes. We had blight for about three years and since that time there has been very little on our trees. I have planted out quite largely of the Transcendent crab, for I had great faith in it when it was first introduced, so I stuck to it all the way through, still believing the blight would only continue temporarily. I have now, I think, one hundred trees or more, and I scarcely observe any blight on them. They do not bear so abundantly as they did when they were young, but still they bear considerable every other year. I have made more out of my Transcendents than all my other apples together.

Mr. Gibbs. I wish to find out if there is any blight now in those Southern districts where it was not up to the time I speak of. Take for instance, the neighborhood of Detroit Lake, and points along the Breckenridge Division on the Manitoba railway from Richfield, and in the Northwest, is there any one who can tell us whether the blight has appeared on the Transcendents?

President Elliot. I think Mr. Fuller has reported some blight.

Mr. Thielman. Mr. President, I would like to know if there is any one who knows what causes blight?

President Elliot. Well, that is a question on which the doctors disagree. I don't know but what nearly every man that has given it thought, has a theory of his own. Some attribute it to one thing and some to another.

Mr. Thielman. The blight I had on my Transcendents was in the Summer time. They seemed to be healthy. They had young shoots about a foot long, and after a heavy cold north wind the leaves commenced to wither.

Prof. Pendergast. I would like to say a word that would throw some light on this matter of blight. In traveling in Massachusetts

some years ago, where they never have cold weather, on account of being surrounded by the sea, I noticed more blight among the pear trees than I have noticed among the Transcendents. I said to myself if this is the case, the cold weather cannot have anything to do with blight on pear trees. Massachusetts is a great country for pears, and wherever I went I found the leaves were all dried up, and sometimes the entire tree was killed; not a tree that I saw but was affected with blight, in that country surrounded by the sea, and warm in Winter.

President Elliot. There has been a good deal of thought put on this question of blight. We all know that when a tree is healthy and making a healthy growth, and everything about it is congenial to its health, we don't see much blight. Some attribute blight to the over production of sap, and others to the want of sap; the leaves cannot manufacture sap fast enough, and that the leaves manufacture too much sap. I think the constituency of the soil is where the trouble is, some element in the soil being deficient.

Col. Stevens was then called upon to read his paper. He said: When, at the request of our president, I commenced to prepare a paper on the wild flowers of Minnesota, I found I had an elephant on my hands; I thought I could get it up in a day or two, but found it took a month or two. I found we had over eight hundred varieties of flowers and plants in Minnesota, and that if I extended my paper as it should be, it would occupy a whole book, hence I condensed it. I have a representation of every family of flowering plants, and if I should attempt to read all my paper it would take me two hours, and I think, on that account, it would be better, perhaps, to dispense with the reading of it.

By request Colonel Stevens then read part of the following paper.

WILD FLOWERS OF MINNESOTA.

By Col. J. H. Stevens, of Minneapolis.

Mr. President, Ladies and Gentlemen.

In the latter part of May, 1851, it was my pleasure to accompany Hon. Amos Tuck, then a distinguished member of congress, from New Hampshire, through some portions of the territory of Minnesota. At that time the prairies were covered and the woodland was full of beautiful, delicate wild flowers. That gentleman's delight was unbounded. He frequently quoted the couplet:

"Full many a flower is born to blush unseen,
And waste its sweetness on the desert air."

Minnesota, in those days, had a rich flora. So it has now. At

your request, Mr. President, I will attempt, at this time, to describe some of the eight hundred species of wild flowering plants we have in this state. In doing so, I bring to my aid Dr. Chas. L. Anderson, now of California, but at an early day a distinguished citizen of Minneapolis, and a botanist of a high order. First, then, the

SPRING FLOWERS.

1 *Pulsatilla Nuttalliana*. *Pasque flower*.—Gray. *Pulsatilla Patens*—1st ed Gray. *Anemone Patens*—Hooker. *Anemone Nuttalliana*—De Candolle. *Anemone Ludoviciana*—Nuttall.

Appears about Easter, hence its common name. At first a mere flower bud, thickly coated with long silky hairs, raising its head perhaps near a snow bank, light purple, borne on a long scape, as the season advances, twelve or fifteen inches high. The flower, at first closed, soon spreads and becomes about two inches in diameter, with an involucre made up of very narrow leaflets, forming a cup around the stem. The scape issuing from this, gradually lengthens until the flower is six or eight inches above it. The sepals of the calyx—for it has no petals—in the course of two or three weeks fall off, leaving the fruit or seeds with long tails, the head resembling somewhat a ripe dandelion head. The leaves are all from the root. This is the first wild flower that gladdens the heart of the florist. The Fort Snelling prairie used to be covered with them. It grows in sandy soil on the prairies and in the oak openings. It is handsome and attractive. The root has a strong acid odor, and is used by the Indians for headaches.

2. *Ranunculus rhomboideus*. *Rhomboid leaved crowfoot*.—Goldie.

Almost as early as the Pasque flower, is seen this little *Ranunculus*, with its bright yellow flowers, in the moist places on the prairies. The root leaves and lower stem leaves are roundish and notched—the upper stem leaves are three to five parted, and sessile. The seeds in round heads are eye shaped, with a minute beak, stems three to six inches high, sometimes not larger than the root leaves; petals large, exceedingly small calyx. This description will distinguish the rhomboid from other species of the *Ranunculus*. It is the first *Ranunculus* that appears in this vicinity, and although of little interest, it often puzzles the botanist to find its scientific name.

3. *Hepatica triloba*. *Liverwort*.—Chaix. A beautiful early flower found in the woods, on the banks of streams, early in the season. Flowers, one inch in diameter, pale blue, varying to white—on scapes three or four inches long. Leaves all from the root—three lobed—the involucre also is three lobed like the leaves.

4. *Iospyrum biternatum*. *Enemion*. A very handsome little flower found very early and in localities with the liverwort, of which it is a cotemporary. No petals, pistils about four, spreading in fruit, two or three seeded. Flowers white, axillary and terminal, three-quarters of an inch in diameter, five petal-like sepals,—stamens numerous. Plant six inches high, resembling the rose anemone. Fibers of the root thickened here and there with little tubers. Has no common name. Leaves from root and stem, biternate. Leaflets two and three lobed.

5. *Erythronium Americanum*. *Dog's tooth violet*.—Smith. Among the earliest of flowers, and is the first comer of the lily family. Leaves pale green, spotted with purplish, and dotted—all from the root. Flowers yellow, one inch long, six sepals, nodding on a scape six or eight inches high. Sometimes called Adder's Tongue. The root is a bulb. A very pretty flower.

6. *Dicentra cucullaria*. *Dutchman's breeches*.—De Candolle. *Dielytra Cucullaria*—old name. *Corydalis Cucullaria*—*Persoon*. Very early, a beautiful smooth plant with finely cut, long stalked leaves, and a raceme of nodding angular looking flowers. Plant about two inches high, growing from a cluster of tittle-like tubers. Leaf and flower stems growing up separately.

7. *Thalictrum anemonoides*. *Rue anemone*.—Michaux. *Anemone Thalictnoides*.—Linneus and Biglow. A lovely little plant only about four or five inches high. Blooming early in May, in somewhat sandy, open, brush land. It grows from a tuberous, thickened and clustered root. There is a cluster of leaves just beneath the flowers forming a sort of involucre—and a cluster of about four flowers—one or two in full bloom, on filaments one half inch long, inserted on a common axis with the leaves—forming a simple umbel, white, varying to light pink—an inch in diameter—sepals seven to ten, pistils tipped with a flat stigma. Root leaves mostly thrice three divided.

8. *Anemone nemorosa*. *Wind flower*.—Linneus. Distinguished by a single white flower, purplish outside, three quarters of an inch in diameter, growing from a cluster of three leaves which are each three divided, forming a sort of involucre. The root leaves appear sometime after the flower is in bloom, similar to the stem leaves on a common foot-stalk. An interesting little plant.

9. *Viola*. *Violets*.—Of the seventy-five species known to the world, twenty-nine are natives of this continent.

There are representatives in Minnesota of all the sub-divisions, and yet but few of the identical species found elsewhere. In this immediate neighborhood there are six species; in the state several others in addition to those found in Minneapolis. Those here are

1. *Viola cucullata*—Aiton. Common blue violet, the leaves are hood-like and the petals bearded.

2. *Viola pedata*.—Linneus. Bird-foot violet, grows on prairies. Petals not bearded, pale blue varying to white, prominent nose-like stamens, projecting almost even with the disc of the flower.

3. *Viola delphinifolia*.—Nuttall. Lark-spur violet. Leaves similar to No. 2. Petals deep blue, bearded, not spreading like the pedata. Grows in moist places.

4. *Viola blanda*.—Wildenow. Sweet white violet. Grows on the edge of marshes and meadows. Mildly sweet scented, petals highly bearded, streaked with purple. Leaf and flower shaped like No. 1 but smaller.

5. *Viola palustris*—Linneus. Marsh violet. Grows in marshes. About the size of the blanda and quite similar in appearance. Flower pale blue; petals nearly beardless. Sometimes called the mountain violet.

6. *Viola pubescens*—Aiton. Yellow violet. Has stem leaves and root leaves. Petals bearded, yellow, lower ones veined with purple. Grows five to twenty inches high.

Other varieties, natives of Minnesota, I need not enumerate, but will proceed to speak, of

SUMMER FLOWERS.

With the early days of July, we are almost bewildered with the profusion of wild flowers. We hardly know where to begin. Go where we will, we are greeted with the pleasant fragrance and rich beauty of the late spring and early summer flowers. The prairies are clothed in purple and gold. The swamps are enriched with gems of most singular shapes. The woods are festooned with flowers, fruits and leaves.

Some of our sweetest and most abundant flowers are

1. *Rosa lucida and blanda*.—These are the wild roses everybody recognizes. It is one of the most pleasant of the summer flowers. June is the month of its glory, but it is frequently met with much later. There are but two species. The Botanical descriptions, however, indicate that the two run into each other.

2. *Geranium maculatum*—Linneus. Known commonly as spotted or cranesbill geranium. The flowers are light purple, bearded on the claw of the petal, two or three on a single pedicel, one inch wide, stem erect angular and branching. Leaves five to six cleft; those from the root on long petioles, those from the stem on short petioles, opposite; two or three inches in diameter. perennial and worthy of cultivation for its beauty and medicinal qualities. There is another species—the *Geranium Robertianum*, or herb Robert. Its flowers are small, and the plant has many slender branches from a rather stoutish main stem.

Of the seventy-nine species of Geraniums, only the above two are used in medicine, and singularly enough they are the only two found in Minnesota. The root of the *maculatum* is powerfully astringent. The plant contains a large portion of tannic and gallic acid.

3. *Anemone Pennsylvanica*—Linneus. A pure white, fine sepaled, yellowish centered little flower. We have already met some of the anemones and their cousins among the spring flowers. Leaves resemble in general appearance the *Geranium maculatum*. The root leaves are five to seven cleft, on a long, naked petiole. The three stem leaves resembling an involucre are sessile, and in a whorl, from the center of which issues at first a leafless flower-stem bearing a single flower. Afterwards one or two lateral flower stems from the same axis start up, bearing two three-parted leaves, or involucre, from the center of which a leafless flower-stem, similar to the first, springs forth, thus producing a succession of flowers during the whole summer. Plants six to fifteen inches high; silky-hairy all over. Fruit in a globular head, rough, with long points from each carpel. Flowering from June to August. There is another species called *Anemone cylindrica*, which is taller. The flowers are inconspicuous, and the first heads are an inch long, and cylindrical.

4. *Lonicera*. *Wild honeysuckles*.—Of these we have several species. I will only enumerate a few of them: First and most common is *Lonicera parviflora* with greenish-yellow, tinged with purple flowers; leaves smooth oblong, pale bluish green; *glaucous* underneath. The flowers are small and sometimes cinnamon colored. *Lonecera flava*, or "yellow honeysuckle," has leaves glaucous on both sides, and the yellow flower has a slender tube, and scarcely protuberant gibbons at the base. *Lonicera ciliata* has greenish-yellow flowers, funnel shaped, about three-quarters of an inch long; berries red. Most of the native honeysuckles of Minnesota are eminently worthy of cultivation.

5. *Delphinium azureum*.—Michaux. There is but one larkspur indigenous to our state. No one can fail to recognize it, with its sky-blue or whitish flower, a very beautiful flower.

6. *Rudbeckia hirta*—Linneus. This is the rough cone-flower, and one of the first of the larger composite flowers to grace our landscape. Although some botanists place its flowering time in August, it is much earlier in Minnesota, and appears by the fifteenth of July. Its dark purple center and bright yellow petals distinguishes it from other flowers.

7. *Chrysopsis villosa*—Nuttall. This is the golden aster, and the only chrysopsis that grows here. It makes its appearance in abundance about the middle of June. Flowers, bright yellow; the upper leaves are stiff, hairy; the stem and lower leaves are less so, having long silky hairs intermixed; plant about one foot high; rays about twenty-five; heads large and numerous.

8. *Pentstemon grandiflorus*—Frazer. The "large-flower pentstemon" is a fine showy flower, which is oblong bellshaped, pale purple, two inches long, calyx five parted, corolla faintly two-lipped the upper lip two-lobed, the lower three lobed or cleft, stamens four with a fifth sterile filament, which is not bearded as in other species of this genus. The whole plant is entirely smooth and pale green, leaves thick, rounded, the upper ones clasping. Flowers in June. It was very abundant in 1852 on the bluffs and grounds that are now occupied by the state university buildings.

9. *Cypripedium*. *Venus slipper* or *lady slipper*. Everybody knows and admires this plant. It is not necessary to describe it.

10. *Platanthea dilatata*.—Lindley. Northern White Orchis. With the rich fragrance of a pink, and its beautiful spike of delicate, little odd-shaped flowers it is one of the most beautiful natives. It has a long spike of white flowers. It is found in moist lands and swamps.

In similar localities the Northern Green Orchis, *P. Hyperborea*, is found. It closely resembles the white one except as to fragrance and color, having green flowers and no fragrance.

10. *Sarracenia purpurea*—Linneus. A remarkable plant, with leaves like diminutive pitchers and a flower that can be better seen than described, called the "pitcher plant" or "huntsman's cup." The style is very peculiar, in a double sense. Botanists tell us that it is expanded at the summit into a very broad and petal-like five angular, five rayed, umbrella shaped body. The leaf, which is a tube partly filled with water, will enable any one to recognize it.

11. *Calopogon pulchellus*. Grass Pink.—R. Brown. A beautiful flower belonging to the orchis family. It grows from a bulb like an onion. Flowers are pink purple one inch broad. The structure is very curious and not easily described. The plant is about one foot high and two to six flowerd. Leaves are grass-like. Along with the Grass Pink is found the

12. *Pogonia ophioglossoides*.—Nuttall. Resembles the preceding. The flower is less spreading, single, or two to a stalk, nodding and a light pink-purple, one inch long. Plant about nine inches high, with a single smooth leaf about midway of the stem.

13. *Linnaea borealis*.—Gronovius. Twin Flower, named and dedicated to the immortal Linnaeus, and I believe the only flower that bears his name. Modest but beautiful, fragrant, a trailing evergreen with rounded oval leaves. Peduncles three inches high forking into the pedicels, each bearing a bell-shaped flower, purple and whitish, hairy inside, stamens four, two shorter, calyx teeth five, corolla five lobed. Grows in patches covering sometimes a quarter of an acre with its matted vines. Thrives in cool, mossy, shady places among the cranberry vines.

Labiatae. Along with the late days of August, prominent among the flowers appear many of the mint family. Mints have been known and highly esteemed for their medicinal qualities, as far back as history gives any record of the human race. Their medicinal virtue is mainly owing to a volatile oil, contained in small sacs in the leaves. There are a great many varieties in Minnesota. The most showy are

1. *Lophanthus anisatus*.—Bentham. Found abundantly, about three feet high, with long interrupted spikes of purplish flowers. Stamens four, two long and two short; longer than the flower. Leaves ovate, acute, serrate, whitish underneath, with a very minute down; otherwise the plant is smooth; may be readily distinguished by the foliage having the taste and smell of anise; called, commonly, the anise hyssop.

2. *Monarda fistulosa*—Linneus. This is called "Wild Bergamot," about two and a half feet high; downy or smoothish, Leaves ovate, lanceolate, serrate. Flowering in heads, round-flatish, at the end of each branch of the main, stem purplish; upper lip acerate, lower lip three lobed; middle lobe much longer, and notched at apex. The style projects far beyond the stamens and flower. Foliage has a very pungent taste and a strong aromatic odor.

3. *Stachys palustris*.—Linneus. Is known by the name of "hedge nettle." Found about fences, margins of lakes and damp grounds; about eighteen inches high, with a long spike of whorled purplish flowers; stem and leaves thickly beset with stiff hairs; calyx nearly equally five toothed; upper lips of flower erect, entire or nearly so; lower lip three lobed, middle one longest; stamens, four, ascending under the upper lip; a very variable plant. There are a good many varieties, and a description of each is difficult, for they pass into each other imperceptibly; one has heath shaped leaves at the base; another is smooth and whitish; glabrous throughout or with very few bristly hairs.

4. *Pycnanthemum lanceolatum*.—Pursh. This is a species of "basil" or "mountain mint;" grows abundantly, about one and a half feet high; flowers in terminal heads; hairy, nearly white, with dots and a shade somewhat purplish; upper lip with a notch; lower lip three lobed; stem much branched, form angular, with angles pubescent; leaves drooping, lance shaped and close to stem; heads of flowers small, in numerous clusters; sweet scented; plant has a taste similar to pennyroyal, for which it is used as a substitute, answering a good purpose.

There are a great many *Leguminous* plants natives of this state. Of this numerous family I can mention but a few.

1. *Petalostemon*. (*Prairie clover*.) The *Petalostemon candidus*, *P. violaceum* and *P. villosum*. The first two are found side by side on our prairies; the *P. villosum* is only found on exposed sandy banks. They have odd pinnate leaves; dotted with glands, small stipules -- a one seeded membranaceous pod. The main distinguishing feature of the genus is the arrangement of the five petals. Four of them are borne on the top of the sheath of filaments; and the fifth one or standard, is inserted in the bottom of the calyx. *Violaceum* is rose purple, *candidum* is white flowered. The heads of both species, cylindric, about one inch long. The other species, *Villosum* is silky--villous; has purple flowers, and a long tapering head. It is a fine showy plant, and worthy of a place in our gardens. The *violaceum* has a fine aromatic odor, somewhat like thyme, when bruised.

Amorpha Canescens.—Nuttall. This is the famous lead plant. It grows abundantly in soils made up partly of the debris of magnesian limestones, and hence as lead ore is peculiar to these rocks, the lead plant, was supposed to indicate the presence of lead ore. It has a one seeded pod, the plant is easily known by having but one petal instead of five, as is usual with *Leguminous* flowers. This petal is the standard; leaflets are marked with minute dots. Flowers dark violet, crowded in a cluster on terminal spikes.

Amorpha fruticosa. Larger, taller, and not whitened with hoary down. Only found on river banks and shores of lakes. Pod two seeded. Otherwise like the *Canescens*. A handsome plant--sometimes called False Indigo.

Liatris.—Schrebee. *Blazing Star*. *Gay feather*, *button snake-root*. Several species of the *Liatris* are natives of Minnesota and on account of their beauty and abundance they deserve especial mention. The *Liatris* is a genus of plants of the composite family, distinguished by heads of handsome rose purple flowers; five lobed corolla--stem resinous, dotted, alternate, rigid, entire leaves.

Liatris cylindracea is found on dry, open prairies, only twelve or eighteen inches high, with grass-like leaves from one to twelve inches long. The head is cylindrical and the pappus is feathery-plumose. Flowers bright purple; scales of involucre rounded with a short, bristly point.

Liatris scariosa. *Gay feather*, grows in woods and brush lands,

four or five feet high. Heads not numerous. Before opening, globe-shaped; scales of involucre, often with colored tips spaxulate or obovate, with dry, membranous, rough margins, bright purple.

Liatris Pycnostachya, is found in moist meadows. Flowers in dense, showy spikes, heads small, about five-flowered, one-half inch long. Scales of involucre, oblong or lanceolate, with recurved or spreading colored tips. Grows four or five feet high. Pale purple flowers. These blazing stars are very abundant in many parts of Minnesota, and are truly handsome, relieving the monotony of the prairies and meadows by their gay flowers. They begin to bloom about the first of August and continue until frost. They all possess active medicinal properties, being used in empiric practice for all kinds of diseases.

In addition to these common, yet attractive flowers, already noticed, I will mention two of less frequent occurrence, but which for beauty cannot readily be excelled by any of the finer cultivated flowers. They belong to the orchis family and make their appearance during the summer months. On the upper Minnesota river they are quite plenty, and are sometimes found on the high prairies in many parts of the state.

Platanthera leucophea—Nuttall, or "*Western orchis*." Flowers white, large. The divisions of the tip are fan-shaped, thread-like fringed, open about two inches long, considerably longer than the ovary; stem two or three feet high. It would make a valuable acquisition to the garden.

Platanthera psycodes—Gray. This is the "small purple-fringed orchis." It is found in moist meadows; grows about two feet high, with a cylindrical spike, four to seven inches long, of beautiful purple, fragrant flowers; blooms in July. Some confusion has occurred in regard to its name. It is undoubtedly the orchis *psycodes* of Linnaeus, which is synonymous with the name I have used—*platanthera* being originally embraced in the orchis genus. The large "purple fringed orchis"—*P. fimbriata*—is a beautiful flower, and is common in the western part of the state.

AUTUMN FLOWERS.

"But on the hill the golden rod,
And the aster in the wood;
And the yellow sunflower by the brook,
In autumn glory stood."—*Bryant*.

Autumn is no less rich in floral beauty than Spring or Summer in Minnesota. It is true the soft and delicate flowers have mostly perished in the heat and drouth, and cold nights of early September days. But there is a new world of beauty in the profusion of compound flowers universally distributed over the whole state in the fall of the year. The Compound or Composite order of plants is easy to recognize by the several flowers contained in a head. In other words, flowers within a flower. For instance take the smallest head of a "golden rod," and by the aid of a magnifying

glass, it will be seen that it contains little flowers within—each one composed of fine stamens with their anthers united, forming a cylinder around a two-branched style. It also has a corolla, tubular and fine toothed. The head of florets is surrounded with a scale-like involucre, and rays, which are analogous to the calyx and petals of a single flower.

A majority of the compositæ do not bloom until near autumn; as if their complex nature required a longer time to mature, than the more simple flowers. They are more abundant in tropical countries than in the temperate region. One tenth of the whole vegetable kingdom belongs to this order, yet in tropical America, one half is the proportion.

We can mention but few of the one hundred species of compositæ growing wild in Minnesota. Many of the most common flowers belong to the genera *Aster* and *Solidago*. It will be a satisfaction if I can describe the genera of these, so that any one can easily classify them. As for species, that would be rather difficult.

Aster. These are the distinguishing features of the genus *Aster*: The ray flowers are perfect, that is, with stamens and pistils, rays in a single series always white, purple or blue—never yellow. The disk is often yellow, changing with age to purple. The receptacle is always flat, with a honey-comb appearance. The seed-covering—achenium—is more or less flattened.

One of the most easily distinguishable species is the *aster sericeus*, found on our dry, sandy Minnesota prairies, with solitary bright blue heads, silvery leaves, with an involucre similar to the leaves. Another is the *Aster azureus*. Rays bright blue, lower leaves on long petioles, heart-shaped at the base, and upper leaves lanceolate linear and sessile on the branches, oval shaped. *Aster multiflorus* has numerous small, white flowers; stem crowded with small linear leaves.

Solidago. *Golden rod.* During the past year or two there has been a spontaneous determination on the part of the people of the United States to establish the golden rod as the national flower of the Union. The genus *solidago* has all yellow flowers, except one species; leaves alternate; never heart shaped; heads of flowers small, with from one to fifteen small pistillate rays; stem erect, branching near the top. Minnesota is brilliant with golden rods in September. One of the most prominent is the *solidago rigida*. It is known by its rough rigid leaves, and heads of flowers clustered into a flat topped corymb; two or three feet high; each head contains about thirty-four flowerets. *S. serotina*—"smooth golden rod," grows very large in this state on the bottom lands. *S. Canadensis* is found on the borders of thickets and fields. It is distinguished by its many small heads in one sided racemes. The whole plant is somewhat downy.

Sunflower. The sunflowers are distinguished by the yellow neutral rays—a four-sided and laterally compressed acheneum, which is neither winged nor margined, with two thin chaffy awned scales on its principal angles.

Helianthus rigidus, grows about three feet high, has many thick

and rigid leaves, rough on both sides oblong, lanceolate, slightly serrate. Rays twenty to twenty-five; stem rough, simple and sparingly branched, often purplish; grows in dry sandy places. There is another species that abounds in Minnesota, not well described, probably between *H. decapetalus* and *H. strumosus*. Grows five or six feet high; flowers large, with rays one or two inches long; stem branching considerably, rather rough; leaves ovate lanceolate, serrate, rough above, whitish and somewhat downy beneath. Common along fences and edges of cultivated ground.

Helenium "*False sunflower*." Sometimes called American sneezewort. There is but one species, *H. Autumnale*. It is distinguished by the stem and branches being strongly winged, by the decurrent leaves and numerous yellow flowers with drooping rays. Named from the celebrated Helen, of Troy, who is said to have used the plant as a cosmetic.

Cirsium.—Thistle. There are three indigenous species common in the state. *Cirsium discolor* has leaves green above and woolly white beneath, and pale, purple flowers. Grows three to six feet high, in meadows and copses. *C. muticum*, or swamp thistle, has naked heads, white, loose, webby hair beneath the leaves when young. The involucre is webby glutinous, scales closely appressed, almost pointless. Flowers purple. Very tall, three to eight feet high. *C. pumilum*, or pasture thistle, is low and stout, one to two feet high, bearing one to three large heads, one and one-half inches broad. Leaves have very pretty, margined lobes, shining green above, and green beneath. Outer scales of involucre prickly pointed; flowers purple and fragrant.

We will turn, now, from the Compositae, to notice a few other families. For beauty scarcely any of our common flowers exceed the

Gentians.—These are distinguished by having opposite, sessile and entire leaves, a bitter, colorless juice, regular flowers, often furnished with intermediate plicate folds—blue or whitish. There are five species. 1. *Gentiana alba* or "**White Gentian**," whitish flowers. 2. *G. Andrewsii*, "**closed gentian**"—grows more common than the alba. The flowers are always closed. 3. *G. orinata*, the renowned "**fringed gentian**," a most beautiful flower with bright blue-fringed petals. 4. *G. detonsa* is the "**smaller fringed gentian**" and has very narrow linear leaves and a shorter fringe than the *G. crinita*. 5. *G. puberula* is found on sandy exposed prairies. Leaves are stiff linear lanceolate, stem rough, flowers open with lobes prominent; color, sky blue.

GERARDIA.

Gerardia.—There are many beautiful flowers in this genus. They bloom in July and continue until frost. They are found in marshes, on prairies, and on high lands. The flowers are somewhat bell-shaped, with five, more or less, unequal spreading lobes. The calyx is five cleft, stamens four—two long and two short, flowers purple or yellow, quite showy. There are several species in Minnesota. Although the flowers are scarcely Autumnal, yet they continue to bloom from July to October. The flowers expand in the

morning and fall off towards night. In low grounds and meadows the *Gerardia purpurea*—purple gerardia, is found very abundantly. The flowers are on short peduncles, scarcely as long as the calyx. Corolla about one inch long. *G. aspera* is very similar. The peduncles are longer than the calyx, the flowers are larger and the leaves longer. *G. tenuifolia*, "slender gerardia" has flowers on long peduncles, leaves linear. Calyx teeth very short. *G. setacea* has bristle-shaped leaves, very rough with little points. *G. pedicularia* has pinnatifid leaves, the lobes cut and toothed. It does not grow north of the 45th degree, that I am aware of.

In concluding I will say that there are many species I have not mentioned, but most of the families have been mentioned.

DISCUSSION.

Mr. Barrett. This is a very interesting matter and it concerns us all to save our rare flowers. I wish we could have a little talk on it. We have in our locality—I don't suppose it is peculiar to that locality—what I call the wild pink. It is a beautiful flower and very sweet. I have seen it occasionally on my farm. It is spreading itself over the country and I think it would be a nice thing for bees. Can Col. Stevens give us any information regarding it?

Col. Stevens. You will find it here in the paper.

President Elliot. We have with us this morning a gentleman who is noted for his industrious work in Horticulture. We would like to listen to a few words from Mr. Wright, of Cobden, Ill.

REMARKS BY MR. WRIGHT.

Mr. Wright said that his business had not been that of making speeches. His work had been in fruit. He would simply say that the business of small fruit-growing is not so much depended upon as it was a few years ago. Mississippi, Tennessee, and Louisiana, have got ahead of us. In 1862 we could sell our strawberries in Chicago for \$1 a quart, and would cut off timber and burn it up, in order to have strawberries and peaches. The result was, that Chicago was found not to be big enough for the supply. When we sent 25,000 boxes of peaches to Chicago, it could not get away with them; Minneapolis was not known at that time, and we couldn't get here. Since then, the peach crop has proved nearly a failure; but strawberries are still flourishing, and the President of the Cobden Horticultural Society grows annually about 80 acres of strawberries, and nearly as many raspberries. He ships in refrigerator cars; and makes money, while small growers who depend on Chicago for their market, barely make it pay, because Tennessee, Mississippi and other southern points have the first chance at the market, and strawberries are no rarity when they get them from us.

President Elliot. I would like to ask if under such conditions as we have here, Mr Wright would advise people to uphold the growing of small fruits for a home market, and then dispose of any surplus they may have?

Mr. Wright. I think I would, because you have a home market. We have no home market; we depend entirely upon Chicago or the Northern markets.

Mr. Cutler. What kinds of strawberries are most successful?

Mr. Wright. We have about one hundred kinds. The Wilson has failed, from some cause. You can't grow a crop of Wilson strawberries any more. It has been succeeded by the Crescent, which is a very prolific bearer and makes a great growth.

Mr. J. A. Sampson. What do you use with the Crescent as fertilizer?

Mr. Wright. One gentleman, who has been very successful for several years, fertilizes only with the Sucker State. He plants the Sucker State as a fertilizer with the Crescent.

The following paper was then read by the Secretary:

GROWING AND FORCING HARDY AND TENDER ROSES

By W. A. Hartman, of Minneapolis.

Roses are not so difficult to grow as many are led to believe; good care and attention, are the most essential points for successful growing of roses. Tea roses being the most important of winter blooming roses, we will offer the following suggestions for their culture, which may be of benefit to beginners, whether grown for pleasure or profit. We will start with propagation.

The propagating bed should be in a warm, shady place; give the boards a thick coat of whitewash, put on about two and one-half inches of clean, coarse, sharp sand, pack it down firm and smooth; then water evenly and thoroughly.

The best wood for propagating, is that of young, half ripe shoots from which the buds have just been cut; when they are scarce, the blind shoots will do. Many growers object to blind wood, claiming that like produces like. We make thousands of cuttings annually, from blind wood, and find the plants as prolific as when grown from flowering shoots. The cuttings should be made with two eyes, as these produce the strongest plants; place about an inch apart in the sand in the row; press the sand firmly about the cuttings, and give them a good watering. In after watering, the propagator must use his own judgment, being governed by the atmospheric condition of the house. Syringe every bright morning, in very warm weather; a light showering in the afternoon will be beneficial; in wet weather omit the syringing. The night temperature should be 56° and in the day 70°. Bottom heat is not abso-

lutely necessary. In selecting the wood for cuttings, take nothing but clean, healthy shoots, which are free from spider and mildew. When affected with either of the above, they are liable to drop their leaves; once the leaves are dropped, they may as well be thrown out, as they will never amount to much.

When the cuttings are well calloused, water more sparingly for if they are kept too wet, the roots are apt to be thin and watery. When the roots are from one half to one inch in length, pot off into two inch pots using good light, loam not too rich; place the pots in a light airy position, (avoid all draughts) and keep them shaded in the middle of the day when the weather is bright, and treat them like the cuttings in the bench for a week or more. When the roots show well through the soil, shift up into four inch pots where they may remain until they are set out in the benches.

To prepare a house for winter blooming, put up benches about five inches deep; make the bottom of six inch boards, laying them one half an inch apart; cover the cracks with thin strips of sod, grass side down, then fill with good, rich soil about three parts loam and one part well rotted cow manure; if the soil is very heavy, a little sand may be added; mix thoroughly; do not screen, but break with a shovel or fork. Set the plants from 14 to 16 inches apart each way, press the soil firmly about them, and give a thorough watering.

The temperature should never go above 70° without giving air. Syringe twice a day and in very hot weather three or four times. Flooding the walk with water will lower the temperature from 10° to 12°. Keep the buds pinched off until September, as flowering the young plants too early is apt to weaken them. Keep all dead leaves pinched off, and the soil well stirred during the summer, and free from weeds. In September, when the days are cool, syringe but once a day in bright, days and never, on cloudy or rainy days. All watering should be done in the forenoon, so as to have a fairly dry atmosphere at night. When the outside temperature drops below 50°, a light fire should be started in the evening, especially in wet weather; damp, chilly nights are apt to produce mildew.

In February liquid manure may be used to good advantage. Put half a bushel of fresh cow manure in fifty gallons of water, stir until dissolved, and let it stand until clear then apply lightly once a week. If the roses are wanted for early spring sale propagate in October, pot off in two inch pots and shift into large pots every five or six weeks until the desired size is obtained. Plants intended for winter blooming in benches, need not be struck until February or March, and may be planted out in benches in June. In the fall, if the plants are affected with mildew apply a little flour of sulphur on the leaves and paint the steam or hot water pipes with a mixture of linseed oil and sulphur; this will keep them clean during the winter.

For green fly, tobacco is the best remedy. Smoke the house lightly twice a week, or lay tobacco stems on the pipes, renewing them every six or eight weeks.

Red spiders are very destructive little pests when once they get started, but a thorough syringing every day will keep the plants free from this insect.

President Elliot, then read the following paper:

DESIRABLE SHRUBS, PLANTS AND BULBS FOR LAWN DECORATION.

By Gust. Malmquist, Minneapolis.

I hardly feel able to properly write on this subject, not having been a resident of this state so many years, that I can fully judge from personal experience as to the hardiness of all the plants I would like to mention; but coming from a clime that in many respects does not materially differ from this one—I mean Sweden—I have had opportunity to compare a good many species grown here and in Sweden, and think I am qualified in claiming that almost anything in the line of shrubs and plants we could successfully grow there, would do equally well here.

The most serious trouble we have to contend with here, is not the cold winter, but it is the open winter, with its continually freezing and thawing that does the damage. For that reason, it pays well to protect a little, even such plants as are considered hardy.

Then we have a good many half-hardy shrubs and plants which with very little attention will greatly repay the grower for his trouble.

SHRUBS.

Amelanchier Botryapium and *A. vulgaris* are both deserving of a place.

Amelanchier *nana* and *A. campestris* are both a little tender, but if planted in sheltered places will need no protection.

Aralia Manchurica, (*Angelica tree*) will freeze down unless protected, but will sprout from the roots again. It is a plant of a very striking appearance and should be used more.

Berberis Canadensis, *B. buxifolia*, *B. microphylla*, *B. serrata*, *B. vulgaris*, *B. purpurea* and *B. Thunbergii*, will sometimes top-freeze a little, but are valuable for shrubberies.

Caragana. *C. altagana*, *C. arborescens*, *C. grandiflora* and *C. nana*, should be cultivated, and as they are Siberian kinds they are certainly hardy; *C. arborescens*, *pendula*, and *C. pygmea*, form fine weeping trees when grafted on *arborescens*, Propagated easily from seeds.

Cornus, (*Dogwood*) *alba*, *C. Siberica* and *C. Mascula* are perfectly hardy and their red bark looks bright in Winter time. Their sub-species *Mascula* and *Siberica variegata* with their silver variegated leaves are some of our most striking shrubs.

Corylus (*Filbert*) *avellana*, *atropurpurea*, is a little tender but has a very contrasting foliage.

Cydonia (*Quince*) *Japonica* is tender but when protected will flower well.

Deutzia, *crenata*, fl. pl. and *D. scabra* will sometimes top-freeze a little, but should be found in every collection.

Diervilla (Weigelia). The same may be said of this family as the deutzias.

Eleagnus argentea, has silvery foliage and gives a fine contrast in grouping with other shrubs.

Euonymus Europeus, (strawberry or spindle tree) is perfectly hardy, and has a fine appearance during fall. *E. Nanus* forms nice weeping trees when grafted on Europeus.

Hydrangea, *paniculata* var. *grandiflora*, is perfectly hardy and should not be missed for any reason. *H. Otaksa*. *H. Thomas Hogg* and *H. sterilis* may also be grown out of doors if protected with a covering of leaves.

Mahonia aquifolia, being an evergreen shrub with dark, shining leaves and blue berries it is quite an acquisition and should be found in every collection. The leaves are used a good deal in the old country for wreathing and green, during winter.

Lonicera (Honeysuckle) *apigena*, *L. coerulea*, *L. Ledebourii* *L. Tatarica*, etc. are hardy.

Philadelphus (Mock Orange) *P. coronarius* and *P. coronarius* fl. pl. will sometimes top-freeze, but *P. grandiflorus* seems to be perfectly hardy; if planted in poor soil there is less danger of their being frozen.

Ribes, (Currants,) *aureum* with yellow flowers, is hardy and *R. sanguineum*, with red flowers, is fine but tender, and should be planted in sheltered places.

Rubus odoratus with large rose colored flowers, is very sweet scented, and should be grown.

Sambucus, (Elder) *nigra* with black berries and white flowers, and its sub species *S. argentea*, *S. variegata*, *S. laciniata* *S. heterophylla*, and *fol. luteis*, will sometimes freeze, but sprout out again *S. Racemosa* a variety with yellow flowers and red berries, is hardier.

Salix (Willows.) This large family is very desirable. Most are very rapid growers; they may be utilized in places where some object needs to be hidden, and also in wet places where nothing else will grow, and to fill out places in shrubberies between some slow growing kinds. *S. Amygdallina*, *S. Americana*, *pendula* and *S. laurifolia* and *S. vittellina*, (aurea) are among the best.

Spirea, (Meadow Sweet.) Of this large family I will especially recommend for general culture, *S. ariaefolia*, *S. callosa rubra*, *S. corymbosa*, *S. crataegifolia*, *S. Douglasi*, *S. opulifolia aurea*, *S. salicifolia*, *S. sorbifolia* and *S. ulmifolia*, with many more equally as good.

Symphoricarpus, (Waxberry) *S. racemosus* and *S. vulgaris* are showy in the fall time on account of their berries.

Syringa (Lilac.) Of this family *S. Josikea*, *S. Persica*, *S. vulgaris* and *S. vulgaris alba* are mostly grown, but many of the French varieties are very beautiful and should be introduced.

Viburnum (Snowball.) Of these, *V. lantanoides*, *V. opulus*, and *V. opulus sterilis*, are considerably used, and there are some newer Japan varieties which should be tried.

Roses. As there are really very few roses that are desirable which can be called perfectly hardy, I rather class them as half-hardy, and as such, the hybrid roses, together with a few moss and Bengal roses will be the best to grow; but as this subject has already taken more space than I intended, I will close with a hope that the experiment stations and the city parks will do as much as possible towards introducing more new varieties than we have.

HERBACEOUS FLOWERING AND FOLIAGE PLANTS.

Although many of this class are perfectly hardy it is safest to give all of them a slight Winter protection of leaves or straw.

Achillea, millefolium rubrum, with red flowers, blooms from June to August, and *A. ptarmica fl. pl.* with double white flowers during August, they are very good for cut flowers.

Aconitum Napellus and *A. Californicus*, with blue flowers. *Napellus* blooms during June and *Californicus* during fall.

Althaea rosea fl. pl. (Hollyhock) should be treated as a biennial plant, as it often dies the second winter; New plants from seed should be planted in August every year, in the place where they are to bloom; they are best protected by boxes, pots, etc., to avoid too much moisture for the crowns.

Astilbe Japonica (Spirea Jap.) is fine for edging, with white flowers in June. Late frosts will often kill the flower buds, they should for that reason be kept dormant as long as possible in spring.

Campanula, (Bell flower.) Most of this family are biennial, and should be treated same as Hollyhocks. *Medium* is especially fine with both single and double blue and white flowers during July.

Delphinium, (Larkspur.) Of this *D. formosum* is mostly grown but there are a great many more equally good varieties. It has blue flowers during June and July. After the first crop is through blossoming it should be cut down, then a second crop will bloom during fall.

Dianthus, barbatus, *D. Chinensis* and *D. plumarius*, are all hardy. *plumarius* is fine for edging.

Dielytra (*Dicentra*) *spectabilis*. Clumps of this on the lawn look very attractive during May and June.

Funkia, (Day Lily) *grandiflora*, with a number of varieties, with variegated leaves, are all very attractive plants, they bloom during June and July.

Gypsophila, paniculata, has small white flowers during July; the flowers may be dried for use during the winter time—valuable for florists.

Helianthus (Sun flower) *multiflorus fl. pl.* Blooms during August and in fall; needs protection during open Winters.

Hemerocallis (Day lily,) *fulva*, *H. flava*, etc. Bloom during June and July; showy.

Heracleum Giganteum, has large showy leaves and small white flowers in large trusses; Planted singly on the lawns it gives a tropical effect.

Iris. All of this large family are very desirable, they bloom during June, except *I. pumila* which blooms in May.

Lathyrus (Perennial sweet pea) *latifolius albus*, with white flowers and *L. grandiflorus*, with rose-colored flowers. Blooms from June to September. Valuable for florists and amateurs.

Lychnis Chalcidonica, *L. fulgens*, *L. grandiflora* etc., are all showy, they bloom during July and August.

Myosotis (Forget-me-not) *Alpestris*, *M. Victoria* and *M. dissitiflora*, are fine for edging; they bloom during May.

Papaver (Poppy) *bracteatum* and *orientale*, have very showy scarlet flowers, bloom in June; *P. nudicauli* has yellow flowers, blooms all summer, should be treated as a biennial.

Paeonia The *mutan* or *tree paeonia* should be protected; the *Herbaceous paeonies* should be found in every yard. Bloom during May.

Phlox decussata and its hybrids are some of the most desirable plants in cultivation. There are now hundreds of varieties, and most all colors. Blooms during July and in fall.

Primula (Primrose,) *elator* is hardy, and I believe *P. acaulis*, *P. veris* and *cortusoides* are equally so. They bloom during May.

Spiraea ulmaria fl. pl. Blooms in June.

Statice latifolia and *undulata*, these bloom during August and September; the flowers may be dried and used as immortelles.

Yucca (Spanish Bayonet) *filamentosa*, is hardy, but will look fresher in spring if slightly covered.

The perennial plants have not received the attention they deserve. The cost in the first place is very little above green house plants for bedding, and they have the advantage of lasting for a number of years, and some of them increase very rapidly. By selection a bed of perennials may be had in bloom from early Spring till late in fall.

BULBS.

Most all of these need some protection and they should be taken up and replaced at least once every three years.

Lilium auratum is a little uncertain; will sometimes do well for several years and then suddenly fail. The same may be said about the *L. lancefolium*.

Candidum. The white lily is quite hardy but should be protected from starting too early in spring.

Tigrinum is quite hardy.

Fritillaria aurea imperialis, (Crown Imperial) is hardy. All lilies should be planted early in the fall that they may have time to root before winter.

Crocus is nice for edging and increases rapidly.

Hyacinths and Tulips, these need good covering; they should be taken up when their leaves have turned yellow, and dried in a cool, airy place and replanted in October.

If planted in beds used for other plants during summer, they may be taken up carefully after they are through blooming and be heeled in in a shady place and given a good soaking.

In August they should be taken up and dried, when they will usually be found good for planting again. The young bulbs may

be planted out separately and, will in time, make just as good bulbs as can be bought.

Hyacinths treated this way I have found to flower earlier and more surely than imported bulbs.

DISCUSSION.

President Elliot. I would like to enquire of Mr. Grimes if he has had any experience in growing our native shrubs taken from the timber.

Mr. Grimes. I have not.

President Elliot. I would enquire if there is anyone here who has?

Mr. Barrett. You mean those that bear fruit and flowers. I have taken the gooseberry but as yet it has not done much. I have also the native dewberry. I am selecting some good specimens and testing them and they are proving a success. I anticipate that those I have selected and am growing will prove as good as any of our cultivated varieties. I have also the Buffalo Berry which I am developing on a small scale and it has promised success. The Buffalo Berry grows native on the shores of our rivers and is quite prolific.

President Elliot. Is Mr. Dartt doing anything in the line of selecting native shrubs, and doing anything with them?

Mr. Dartt. I have just commenced, and expect to make that a leading feature. At least I am going to collect all I can of the native shrubs.

Prof. Green. We are making a collection as complete as we can of everything that is desirable that can be cultivated here. I would speak about the Buffalo Berry as being a very beautiful ornamental shrub and one of the finest that grows in this climate; it is perfectly hardy. I would also speak about the Sand Cherry as being a very ornamental shrub for grouping at a distance. It is perfectly hardy always pleasant to the eye and will grow in very dry situations.

Prof. Pendergast. Several years ago I went into the woods and took up about twenty or thirty young tree cranberries, and for quite a number of years they were the most satisfactory shrub I had. In flowering time, they were a most perfect blaze of splendor and completely covered with bloom that part of the garden in which they were. Later in the year, when laden with berries they were very attractive. There is something peculiar about our soil. It was once the bottom of a lake and now there is about a foot of soil on the surface; clam-shells, and such things showing the origin of the soil. I think in any other part of the country but that they

would live for many years, but they died out with me after they were well started.

Mrs. Bonniwell. We had bought a good many plants of gooseberries but they seemed not to do very well, and we went out into the woods, and gathered a lot of plants and cultivated them, and we found they were much larger and not so sour as those we had bought. Then we took up a lot of those highbush cranberries, set them out, and I must say they are very ornamental in the Spring, and also in the Fall.

Mr. Pond. I don't know as I am acquainted with what they call sand cherries. I have tried to raise what they call sand cherries, but I never succeeded in getting any fruit.

Mr. Gibbs. Mr. President I wish to say a word about those sand cherries that may be helpful to our friends here. It is probable that a mixing of different varieties of the same species of sand cherries, may be necessary to make it do well in different situations. I have watched this shrub wherever I have had an opportunity in South Dakota, and I found that, as has been reported in Minnesota, in places it is not bearing; but I also saw it bearing heavily both on light soils, and on heavy soils. My impression is (although I could not substantiate it by actual facts to any great extent), that where you find the sand cherry growing thriftily and not bearing well, it is because it lacks some other sand cherry bush near it to fertilize its blossoms. If you can get plants from different localities, or if you have a chance to observe them, and get plants that have a slight variation and get them mixed up, you will have no difficulty in making them bear. When it does bear, it bears very abundantly. I do not know of any fruit that will bear as many pounds of fruit for the size of plant. It is an annual bearer also.

Mr. Day. The sand berries grow wild on the prairies, where I live. I will give a little experience. I once bought some trees that they called the rocky mountain cherries, for which I gave seventy-five cents apiece. I planted them and in two or three years they bore profusely very nice large berries.

Mr. Sampson. I would like to draw some information in regard to the high bush blueberry. As I understand, from what I have heard, the ordinary blueberry will not bear cultivation, but I have heard that the high bush berry will stand cultivation, and on this point I would like to gain some information.

Mr. Dartt. I had some sent to me last spring from Wisconsin woods and I set them out, but unfortunately the drought killed

them. I expect to get more, and hope after awhile to know more about them than I do now.

President Elliot. About three years ago, I had some of them sent to me. I tried to raise them but they proved a failure.

A Member. I notice about the lakes here, a shrub that we call the Juneberry. I have seen that in some places, where they were very much finer than any high blueberry that I ever saw.

President Elliot. In the early days when fruit was very scarce, when we did not have very many cultivated fruits in our gardens, of course we were looking around pretty closely for anything out of nature's orchard that we could appropriate and there were some sections around the lakes where we could go and gather blueberries by the pailful, but when we tried to cultivate them we did not meet with success. I think nothing can be done with them unless you happen to get some that are a remove from the native variety. If you can cross-fertilize them with something else perhaps you may succeed, but to attempt to count much on them just in their native state is not wise.

Col. Stevens. In reference to the sand cherry, I think it can be cultivated. The blueberry, I know, can be. Any species of blueberry that we have, whortleberries, or whatever you call them, can be cultivated and successfully cultivated. That I know. The sand cherry, I have not had so much experience with, but the whortleberry, the blueberry, and the huckleberry can all be cultivated.

Mr. Barrett. The native sand cherry is a great bearer and will bear so heavily, that the limbs will hang down on the ground, and I find it the most hardy and prolific shrub I have. It is a native plant. To say that they cannot be grown, is against the grain of my experience. I can recommend it in our section of country; our farmers are producing it, because they cannot grow any other cherry with any degree of success. I want President Elliot to defend himself more emphatically or to take back what he said. I failed on the blueberry; I wish we could make it a success. If anyone can instruct me so that I can report to my friends how to manage it I will try again.

Mr. Grimes. You raise too many boys and too few plums,—not enough to go around.

President Elliot. Now, I stated a fact as far as I am concerned, that I have had no success with it, but I do not want you to accept what I have done as conclusive. Let each one take hold of this matter and try to do something. I think here is a wide field for investigation, not only with the sand cherry but with dozens of

other plants that I think we ought to cultivate, and see if we cannot improve on them.

A Member. Do we understand that the gentleman that sits up there by the table has successfully cultivated the sand cherry?

Mr. Barrett. Yes.

A Member. I think it would be a good time to get up and tell the society how he did it.

Mr. Barratt. Why, I simply treated it as I did my other plants. I have learned by hard knocks how to take care of my plants, in the West. I cannot do in the West as I used to in the East. I took special pains to see that the ground was in special condition, by deep plowing. My ground had been cultivated before I put them in. I raised wheat and potatoes on the ground and pulverized the soil, and then these plants were shipped to me in a fresh, excellent condition, early in the spring. I planted them deep, and dressed the soil around them as we do with our other plants. I did not mulch them. I do not think I lost one per cent of all I planted. The antagonism I have had to overcome, is with rabbits; for they, as well as boys, have a great affinity for them—that is, they eat off the bark. The sand cherry is a very hardy plant, and bears excellent cherries. The root of this plant can be used for grafting purposes for other varieties of cherries. It is very healthy.

A Member. What is the quality of the fruit?

Mr. Barrett. It is not equal to some of our cherries, but it has a slightly acid flavor, and is an excellent fruit for various purposes.

Mr. F. G. Gould, of Excelsior, being called upon, spoke very entertainingly of the best methods of building and heating greenhouses, after which the following paper was read:

GREENHOUSES AND HOT-BEDS.

By Gust Malmquist, of Minneapolis.

To properly treat of this subject, it will be necessary to give a short history of greenhouse construction as it was formerly used, in order to get an understanding of the improvements made.

With the advancement of civilization and culture, the taste for flowers and plants for home adornment is increased. In the olden time, only kings and rich landlords employed gardeners and florists. In the true meaning of the word, it is only a recently added branch of horticulture.

The first greenhouses built, were only structures erected for storing of such plants as laurels, figs, myrtle, oranges and lemon, etc., grown in tubs for ornamentation of lawn during summer, and were not intended for growing purposes. Consequently

light was not so much of a necessity as it is now. Later on, a short slanting roof was added, a style which could be seen in old country places, in Europe, only fifteen or twenty years ago; but the increasing demand for flowers and fruits during winter, made it necessary for the cultivator to devise other structures more adapted for cultivation of the desired plants. The shape of green-houses was then altered, the high standing windows were made lower, and it was found that blooming and soft wooded plants did best when placed as near the glass as possible, and the slanting roof was made longer to give more light, and to admit as much sunlight as possible.

Usually the houses were what is termed "lean-to" houses, or the slanting roof leaning against a high back wall. Such houses were used a good deal for forcing fruits, as well as flowers, grapes, peaches, apricots, figs, pineapples and strawberries being mostly grown. For heating, flues built of brick were introduced and in the fruit houses, trenches were filled with fresh manure which gave heat and moisture enough to swell the buds and afterwards the flues were used. Such houses are used a good deal yet in the Northern part of Europe with good success.

The taste for plants and flowers still increasing, this kind of house did not long fill the bill. So houses with a glass roof on both sides were constructed, and hot water was introduced for heating. Although hot water was vastly superior to flues, it did not give entire satisfaction, especially in large establishments where many boilers were needed. So something better was looked for. Subsequently steam was introduced—something like ten years ago—and after many failures it is now recognized as the best medium for heating greenhouses—especially so, for large establishments. The advantage steam has over the hot water system is the ease with which it can be handled; the temperature in the houses can be raised or lowered with but little trouble, and one good boiler can do the work of four or five hot water boilers which means time saved for the fireman. The two houses may be built of any desired length—in some instances they have been built 250 feet long. While with the hot water system they cannot much exceed 70 feet in length in order to have good circulation.

The best style of houses for all purposes, now built are three-quarter lean-to houses (so-called) being usually from 18 to 25 feet in width, the long side facing South, with only 6 to 8 feet glass roof facing North.

Such houses as are just mentioned, are now taking the place of hotbeds; the same as has been said about flowers, being also true about vegetables and fruits. Lettuce, cucumbers, tomatoes, etc., etc., are, with the increasing wealth of the population, fast becoming necessities, for a good table, even in winter time.

The old style of hotbeds made from stable manure are so troublesome, and part of the winter impossible, to handle, that the introduction of houses for vegetable forcing will soon be universal. As yet I believe only lettuce, cucumbers and radishes have been grown here in such houses, but the field is open for the introduc-

tion of other things such as string beans, cauliflowers, melons, tomatoes, etc. Tomatoes, I believe, would be a profitable thing to grow in wintertime. They may, if properly handled, be had ripe during the whole winter. For such purposes I would advise propagating by cuttings; a method which I believe would also be profitable for early field culture, as such plants will set fruit when only a few inches high. I have had plants in 6 inch pots only 18 inches high with half a dozen nice fruit on.

It might be a little early yet to start, on an extensive scale, growing such things; but the time will surely come when a ready sale will be found. Also for forcing strawberries, greenhouses will be useful for the market gardener. It may be claimed that strawberries are imported so early from the Southern States that it would not pay to force them here; but I am sure we will soon have the time here, when people will be found willing to pay even ten times more for good home grown berries, than for the imported tasteless stuff.

The cold frames are also useful for many purposes, as wintering over half-hardy plants, such as carnations, violets, pansies, etc., and for vegetable plants during spring.

A frame planted with early strawberries and covered with sashes in March, will, with little trouble give ripe fruit at least two weeks earlier than field grown plants.

After the two foregoing papers were read, there was considerable discussion as to the relative merits of the different methods of greenhouse heating. Prof. Green was then called upon to sum up the matter, and spoke substantially as follows:

GREENHOUSE HEATING.

By Samuel B. Green, of St. Anthony Park.

For some years now, the advocates of steam heating and the advocates of hot water heating have been fighting each other like cats and dogs.

There is much need of careful experimenting in order to settle the comparative merits of the two systems.

As yet I know of only one exact experiment, having in view the settlement of this much mooted question. That was carried on last winter in Amherst, Massachusetts, in the following way: Two houses each fifty feet long and eighteen feet wide, and as nearly alike as could be made, were built running north and south, on the west side of a hill. One house was piped for steam, and the other was piped for hot water heating, each heating plant being put in after the most approved manner. The boilers were alike in both houses. The records of temperatures in the houses, and of coal consumed by each boiler, during January and February, were carefully kept, and at the end of the period it was found that the house heated by steam averaged two degrees colder than the house heated by water, and it had burned out 500 pounds more of coal in two months. This, together with other experience, confirms me

in the belief that for *small* greenhouses, a hot water heating plant is more economical than a steam plant.

However, this experiment does not prove that hot water is as good as steam for large establishments. I have not carefully conducted experiment to refer to, because none have been tried to test the relative merits of these two systems on a large scale; but I am of the opinion, from what I have seen, that the best system of heating for a large place, is one arranged so that steam or hot water may be used in the pipes as seems best. In cold weather, the pipes may be filled with steam, while towards spring they may be filled with water. Such a plan has been found very satisfactory in practice.

Where steam is used, the boiler should be so large that by a pressure of not over six pounds, all the houses are warmed in the coldest weather.

Now, such complete heating plants as my friend, Mr. Gould, and myself have referred to, are expensive; and many beginners in the greenhouse business, hesitate at the outset about putting so much money into what is a doubtful experiment for them. I thoroughly believe that, if a man has had experience, so that he is conversant with the details of his business, it is proper for him to start in with an expensive heating plant and houses. But if he is just feeling his way along, and does not want to risk much, I am just old fashioned enough to recommend that he commence with a house made of hot-bed sash, and heated with a good brick flue. A good brick flue is very cheaply built, and will do most excellent service as a heater. We have with us to-day a young man who has aided his father in building a greenhouse 120 feet long and 20 feet wide, that when all finished and ready for use, only cost them \$400. They have used their house for several winters, and during the cold months, take off four crops of lettuce. They have made that house pay them well.

Mr. R. Mackintosh, then gave a description of his fathers greenhouse substantially as follows:

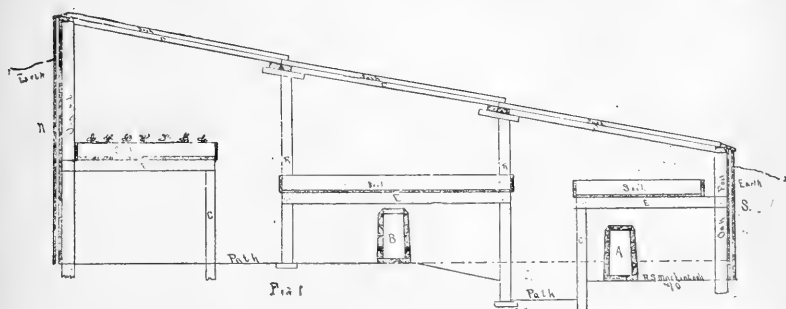
A. CHEAP GREENHOUSE.

By Rodger Mackintosh of Langdon.

The green house that I have been called upon to describe is one hundred feet long and twenty feet wide, with a furnace room at the West end, twelve by twenty. (Fig. 2). The house is built of wood; the posts are oak, four or five inches in diameter. They are placed a few feet in the ground, and at every joint of the sash. The walls are made of fencing, the first tier nailed on the outside of the posts; then a layer of tarred paper, held in place by inch strips nailed on each post. This forms a dead air space when the outer boards are nailed on.

The sash are six feet seven inches long by three feet ten inches wide; made of one and three-fourths inch material, with glass seven by nine. These are larger than the common hot bed sash, so that they

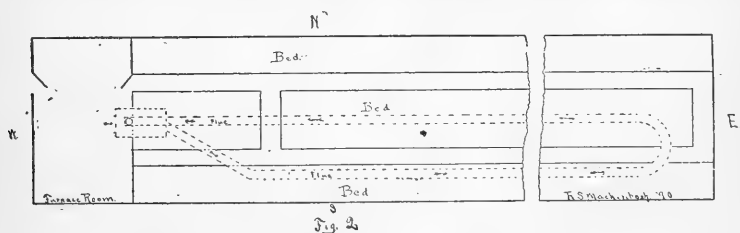
will span a twenty foot house. Every third one of the upper row, is left unnailed to use as ventilator. The sashes are supported by two purlins, one at each lap, and are stayed with a 2x4 inch post. (R.



R. Fig. 1). These also serve to hold the center bench, and at every other joint of the sash two by four inch rafters are placed. (D. D. D. Fig. 1). The posts that support the outside benches C. C., are small oak saplings driven into the ground. On these posts, two by four inch pieces are nailed to support the bench. On them are put the bottom boards one-half inch apart. The soil is about five inches deep in the benches.

This house is heated by a furnace and flue. The furnace is six feet by four feet, outside measure. It is built at the West end of the house, with about one-third of it in the furnace room. (Fig. 2). The top of the furnace is a little below the level of the bottom of the house, so that the flue A, rises abruptly at first, but still allows a gentle rise along its entire length, the return flue B, comes on top of the furnace and enters the chimney which is on the furnace.

This furnace is made large so that we may burn old grubs, roots, etc., which is the only fuel we use, and its walls are eight inches



thick with a layer of fire bricks inside of them, (these fire brick extend along the flue about twelve feet). The rest of the flues are made of common hard brick in this way:—A layer of brick is put on the ground a foot wide to serve as a foundation. On each side of this a tier of four bricks set on their edges are placed. These are drawn together at the top enough, to allow one brick to cover the flue. Before the top brick is put on, the inside of the flue is covered with mortar to act as an extra preventive against the escape of any gas or smoke. Then the top

is put on and covered with mortar. This makes a very good heating apparatus for a very small sum of money.

This green house was built as cheaply as possible so that in case it did not pay we could easily tear it down without much loss, and the sashes could be used for hot beds.

The cost of the above structure was not over \$400. All the boards used were taken from the fences that were on the farm, so there was not a very heavy out-lay for lumber. Unless a person had the same material as we had probably the house would cost him more.

The following paper was then read:

PANSY CULTURE.

By William Toole, of Baraboo, Wis.

When sowing pansies, we must give them as much care as we should other small seeds, to guard against burying or drying them. The seed-bed should be rich and fine, without any coarse manure.

After the surface has been pressed smooth with a piece of board, shallow furrows about one-sixteenth of an inch deep and two inches apart, may be made, with the sharpened edge of a piece of lath, or other thin piece of wood. The covering soil may be sifted on, or spread over with the fingers. We have found nothing better than common sheeting for shading small seeds until they come up, or small plants, of any kind, which have just been transplanted. There are so many kinds of plants which do better if they are started in a nursery bed and then transplanted, that it is worth while to have a number of cloth frames on hand, ready for use, they may be made as follows. Take two laths, full length, and lay one on top of the other, with the ends of each projecting the width of a lath beyond the other, and fasten them together with wire lath nails. Two of such as these are needed for the sides, and two other such, from three-foot pieces of lath, are needed for the ends of each frame. Fasten at the corners, and tack the sheeting taut. With several of these frames over a bed running east and west, having a six-inch board on edge along the front, and a ten or twelve inch board at the back, to support the covers, you are better provided for success with most flower seeds than if you had a hot-bed or cold frame.

The young plants should not be kept too close after they come up, and if the weather is not too dry the shading may soon be kept off entirely. Water the seed bed by sprinkling after they are sown, and as often as necessary to prevent drying. The seeds are from ten to twenty days in coming up, and once drying, through neglect, in that time, may kill them. Florists make a mistake in sowing under glass in July and August, when the weather is too hot for such covering. The plants should be transplanted, from the seed bed, before they crowd each other, causing slender growth, and it is often worth while to plant in a nursery bed, transplanting again as soon as a good stock of white feeding roots has formed.

For a good late Summer and fall show, plant the seeds in such beds as described out of doors, as soon as any kind of gardening can safely be done, light frosts will not hurt the plants. These plants may be in the garden by the middle of June and blooming early in July, but it is better to keep all flowers off until plants are done branching and strong. No seed pods should form before the end of August, and none at any time if best flowering results are desired. For spring blooming plants, seeds may be sown from middle of July to end of August and south of Minnesota still later. The earliest plants may be set in September where they are to stay, covering with a little brush and leaves for winter protection. If the plants are in rows, a still better protection for these, as well as sweet williams, pinks, hardy primulas and the like, is to cover the rows with an inverted V-shaped trough, and throw some litter over this. If intended for spring sales these and later ones may be protected in cold frames, with a covering of boards instead of glass. Glass stimulates too much growth when the plants should rest. For the trade seeds may also be sown in the greenhouse from early in January to middle of February, transplanting when necessary, and putting in cold frame as soon as practicable. Early plants may be started in the house if care is taken to keep them robust and stocky until they can be got out of doors. For winter blooming in house or greenhouse, the plants from July sown seeds are best, and they must be well established in their winter quarters in good season. Old plants will not give satisfaction for winter flowers; but spring sown plants could be kept back for the purpose. Doubtless the very best soil for pansies would be an old, loamy, June grass pasture turned under the Summer previous, with a coating of well rotted manure worked in, and the soil frequently loosened before setting out the plants. The next best soil would be a clover pasture with like management. In the permanent flower garden we do not expect to turn under green crops but a bed of clover or rye would make a fine show even in the lawn, and be as useful for renovating as on the farm. But all that is needed for success is a soil, not extremely sandy or clayey, with a good mixture of fine black manure. A south slope on the south of buildings is too hot, and the shade of trees is like tall weeds. Frequent cultivations with hoe or rake should be given, never allowing a crust to form after either rain or watering. No one point in pansy culture is more important than frequently mellowing the soil.

When transplanting if the soil leaves the roots too freely while taking up, they should be sprinkled with water and fresh soil thrown over them. The same treatment is good for plants of any kind received by mail or express. The amount of shading and watering necessary depends on the weather, often neither being necessary. Pansies are easily propagated from cuttings, layers or with old plants from divisions of roots, but such trouble is not worth while with any kind of plants which are easily raised from seeds, excepting when we have some particular flower which we wish to reproduce true to markings and color. If we make any progress in improving varieties, or in creating new ones, it must

be done through the seeds. Such is the tendency of pansies to mix and vary, there is no need of cross fertilizing to get something new. The greatest trouble is to get the breeding fixed or established after saving seeds from something new. There is also a tendency to reversion, and if our selection for something new is a wide departure from common types we may feel sure that a large proportion of plants from our first savings will not be of the variety we desire. One can easily tell with one season's trial of a new variety what strains it was selected from.

In gathering seeds we must not pick them when too green, nor delay until they are scattered from the pods. Just before ripening the pod stems, which have been like a shepherd's crook, will straighten out and the divisions of the pod where they will separate in ripening will become hard like the rest of the pod. The seeds must not dry in an open vessel or they will scatter. Paper bags will answer for small quantities but care is needed in damp weather to prevent moulding.

Varieties.

We are sometimes asked about the difference between English French, German and American pansies. That question is not so easily answered as a few years ago, because the growers of different countries soon adopt whatever is new from abroad. But in a general way we may answer as follows: English pansies are good robust growers of the old fashioned "face pansy" style, of good size, form and substance. French pansies are often not of as good form as the English or German, but some varieties have flowers of the largest size, and some have beautiful, curious, and even grotesque markings. Trimardeau, Cassier and Odier include the best of the French varieties. The German pansies when received from careful growers include some of the best we have of solid colors, the flowers are of good form, and colors and plants bear our climate better than other foreign kinds. Some of our poorest and cheapest seeds also come from German houses. We can scarcely be said yet to have a distinct American class of pansies established. American customers indicate a preference for solid colors and fancy-edged varieties, and while the French class is selected from catalogue descriptions very few persons give them the preference on sight. When we consider Winter hardiness or withstanding summer heat established American strains are the best, while the French varieties before mentioned bear our summer climate the poorest of any. For this reason they do best if started in the greenhouse for a short season of spring flowering. After a couple of seasons of American growth the Trimardeau bears our climate very well.

We are often asked about Imperial German butterfly pansies and other fancy names. These are names chosen by the dealers and may indicate a particular selection and mixture of varieties, or, as is often the case, there is little but the name to it.

QUESTION BOX.

Q. Is it not advisable for this society to recommend a horticultural to Superintendent Gregg, who would aid in that good work in the farm institute?

This question brought out a good deal of discussion as to the opportunities for disseminating horticultural information at the farmer's institute. The opinions expressed were in favor of an increase of the time now devoted to this purpose. The good work of the institute, and Superintendent Gregg's management of them, received the highest endorsement.

Mr. Somerville then spoke as follows:

This work is not going to be accomplished by flowery speeches, nor will it be accomplished in one or two years. A good man sent out as a misionary can always find some leading man whom he can get interested; let him go to that individual and show him the necessity of planting trees around his house to beautify his home and give protection for his stock. Let such a man go out to do this work even if you have to furnish him with trees at a low price to start him. If this is done you well see the influence of his work spreading out in all that neighborhood in a short time.

Out at Sleepy Eye I have a son who is a lawyer. It was supposed there could not be any evergreen trees grown in that neighborhood. They had tried evergreens that they had bought from peddlers, and they were perfectly disgusted and said there was no use in trying to grow them. I told my son, I was going to take out some trees and surround his lot. He said, they wouldn't grow. I said, we would try them. So I took out about forty trees and set them out. In a very few years those evergreens had made a fine lot of trees, perhaps ten or fifteen feet high and are now all alive. The result is that nearly everybody around there now wants trees. There was hardly a tree growing in that community when I set these out. There has to be a starting point and we must get some man to make the first start. In my town, where I live, there was hardly an evergreen to be seen until I started growing them, and now it is difficult to find a farm that has no evergreens upon it.

Mr. Gray. I move that the question of recommending a man to attend to the horticultural interests of the state at the farmer's institutes be refered to the executive committee of this society with power to act.

The motion was seconded and carried.

Mr. Latham then announced that lunch was ready.

President Elliot. Before we adjourn to the room below, I wish to say that we have a gentleman with us that we have never met before in our conventions and whom we would like to have come forward so that we can give him a more formal introduction. I refer to Prof. McLain.

Prof. McLain then came forward and said:

I don't know of anything to say to the members at the present time. I have consented to talk to you this evening on the structure and business of keeping bees and have come prepared to do so. I have not very much strength as I am just recovering from la grippe, but I will endeavor to do the best I can, this evening. I shall be pleased to meet you, each one, individually, and make your acquaintance.

THURSDAY AFTERNOON SESSION.

JANUARY 23, 1890.

After partaking of the excellent lunch which had been prepared through the kindness of the ladies of Excelsior, the meeting was called to order by President Elliot.

President Elliot. We have with us to-day a few friends from the farm school and I would like Dr. Perkins to say a few words to them.

REMARKS BY DR. PERKINS, OF EXCELSIOR.

Mr. President, ladies and gentlemen and boys: I say "boys" advisedly, for the most endearing term of my life has been "boys", comrades with whom I associated during the war, and who stood shoulder to shoulder with me, and as I have formed the acquaintance of those great men here to-day, I have been almost tempted to say "boys" to them.

I was thinking a little while ago about the wonderful opportunities that the boys of this present age have,—the golden days of youth. I can remember in my school days when the greatest requirement of the school teacher sought by the committee was to "whale," or in other words to hold school. They went on the principle that there was no learning without "licking," and the young man who graduated the best, at the close of the winter session, was the young man who had vigor enough to put the school teacher out of the window. My mind goes back to the old school house where the boys smothered out the fire in the stove, and where we whittled the ink-streaked desks. What little we did go to school, we went under the spur and the whip, because there was no such thing as sympathy then; and I have on my head to-day

the scar of a cut caused by the teacher throwing a ruler at another boy which struck me. I was over near the University the other day and called at the home of one of the students, and when Willie came in he went over into the corner and sitting down began tapping on a little instrument and in a moment his tap was responded to. I found that he had a Morse telegraph instrument and was talking to one of his comrades in another part of the city. I mention this merely, as an illustration of the opportunities of the time in which you live. You are naturally bound to absorb learning as it is introduced to you to-day. I say you are living in golden days and have golden opportunities. You boys, surrounded by these opportunities, ought to do ten times as much as the men have done who today are old men, and I believe you can do it with less labor I believe as I visit the schools which are so comfortably heated, with ventilation perfect and the air as fresh in the schoolroom as it is out of doors, and think of the opportunities and surroundings you have, that much must be expected of you because much is given unto you. Many of the men here have obtained whatever schooling they have got amid doubt and trouble; they have had to work for a living and they have had to study out this system of horticulture by hard knocks. You have heard to-day the results of green houses, etc., but these men have had this experience all to make and the rich experience they have had is laid before you.

I say to you "God bless you." Set your standard as much higher than your father's as your father's was than theirs, and I will close by saying as the old Indian did to some students he was addressing "Go on, go on, go on." (Applause.)

The President then called on Col. J. H. Stevens to say a few words.

REMARKS BY COL. J. H. STEVENS.

I don't know as I can add anything to what has been said by Dr. Perkins. The whole State is watching you with much interest as you are among the first that have ever attended a school of this kind. In a few years more you are going to take our places here and I have no doubt that with the chances and opportunities you have, you will conduct the matters of life in a much better manner than we have been able to do. (Applause.)

REMARKS BY WM. SOMERVILLE, OF VIOLA.

I truly feel incapable of saying anything of interest before such an intelligent company of young men as I see here before me today. Having had myself only the advantages of some thirteen days' schooling in my life you could not expect that I had very many of the advantages of

education. The system of education employed in my school days was to teach by telling the rules over and over and "beating" them in. You young men live in a different age and have advantages that we never enjoyed in the earlier days. Young men I am glad you have these opportunities, because it is well said that where there is intelligence there is no danger of drifting back into barbarism. You are getting the theory of all that we know from our experience in regard to agriculture and horticulture, and you will readily see that you have advantages that we never enjoyed.

Now, the first true principles in forming character are truthfulness and honesty. These traits I trust you have all secured. These are essential to your future welfare and advancement. Whatever you undertake to do resolve to stick to it until you carry it through successfully, remembering that there is always the uppermost seat to be reached. I feel happy to say that those who have striven for that have always reached the top rung of the ladder. While you young men have these advantages we are growing old. I have lived my three score and ten years. What I have learned has been by practice and experience, while you know more of theories perhaps, than I have learned during seventy years of practice. You are altogether in advance of where I am today. All I can say to you is as Dr. Perkins says, "go on." There is a brighter day before you and who can tell but some of you young men may be future presidents of the United States. (Laughter and applause.)

President Elliot. Mr. Dartt, can you say a word of encouragement?

REMARKS BY E. H. S. DARTT, OF OWATONNA.

Mr. President you say encouragement; I assure you I would like to say very encouraging things. We see before us the sum and substance of the next generation. The young men of this age in twenty years from now, will be our nation. And it becomes a matter of a great deal of importance to us what position these young men shall take. Now, we see in the nation (at least I think I see) a nation that will follow principle rather than policy. It is said that nations as they grow older, grow stronger. If that is so, it depends upon the course you young men take whether our nation shall prove to be worse or better. If policy is followed, we cannot think that the welfare of the nation will be secured; but if principle is made the point, then we can feel secure; we can then feel safe that when we get through, the next generation will do better than we have done.

There was one idea advanced here today that I rather deplored.

A gentleman intimated that it was not safe for our horticulturalists that went out with the farmers' institute to tell the whole straight truth as it would be too discouraging; and that we must blur it over, as it were, in order to make the people believe we are making progress. Now, it occurs to me that that was a wrong teaching. I say the truth should be told fairly and squarely however unpleasant it may be, and I hope that all of you will go upon principle rather than policy; that you will make truthfulness the rule of your lives, and I think if you do that, whether you please the multitude or not, you will please yourselves.

REMARKS BY J. T. GRIMES, OF MINNEAPOLIS.

Young men of the state agricultural school, we are glad to meet you here today, but after all the wisdom that has been supplied by my predecessors who are all older and more experienced than myself it would be hardly necessary for me to add a word. I will only say this: That the world is making progress. When I was a boy it was thought that if a boy wasn't smart enough to be a lawyer or a preacher, or a doctor, he would perhaps do for a farmer. Now, you have placed yourselves under the care of a very efficient teacher, one whom I have known a long time and who is capable of giving you good instruction in the right and proper direction. It is for you to receive the benefit of that instruction cheerfully at his hands. This is an age of progress. I remember the time when the first steamboat was started, and when our freight cars were drawn by horses. We had no telegraph, we had no telephone, and a great many things we did not dream of at that time, are now in use, and are things that we cannot very well do without. Now, you are living, as one of my colleagues has said, in an age of knowledge, you are living in an age when you have all the benefit of the knowledge the world has acquired. And you have an opportunity now to improve that knowledge and make it your own. You will find it capital that will be of use to you in your future life.

All I have to say further is: "Improve the opportunities you have." (Applause.)

REMARKS OF J. S. HARRIS, LA CRESCENT.

Mr. President and young men of the state agricultural college: It is hardly fair to call me up after these wise and eloquent men, that have just spoken. I am heartily glad to welcome you to participate in this meeting and to take lessons from the objects which are upon exhibition before us. This horticultural society is one that I take a great deal of pride in; I

feel a deep interest in its welfare, and I believe my name was first upon the roll of members. We have been working along in this line, but we old pioneers are beginning to show the trace of time. We are getting to dread stepping over the high places and probably in a short time we will be among the number that will be taken off the stage, perhaps out of the stage of existence, and we feel a great anxiety for the welfare and prosperity of this society, because we believe that the state horticultural society has a wonderful mission to perform. The mission of the state horticultural society is to make the wilderness blossom as the rose, it is to build up all over the prairies and hillsides and valleys of this great northwest, the most fruitful and the most beautiful farms and homesteads; places that will be a paradise, places so beautiful to live in, that the birds, of the tropics, will come up and make their homes with us. It is in this work we feel so much interest, and we want to know who are going to step into our shoes, and we are glad to know that there is a good large class of young men—we call them boys but they are our future harvest hands—that are qualifying themselves to carry on the active work of agriculture and horticulture in Minnesota and to take our place, and do work far better than we have been able to do. Gentlemen, some of you may think that the pursuit of agriculture is a hard way to make a living, but it is the easiest method I know of, to make a good honest living, and raise up a family about you and enjoy the world as you go along, and be pretty sure of a little competence at the end of that time to make easy your declining years. The pursuit of agriculture, places you right in close communication with nature,—nature's heart and nature's God, and you can be educating yourselves and drawing nearer to nature from the time you leave your school room until you lay down your work here upon earth. I shall hope to hear that the great majority of you have gone from the school to the plow, not to draw a better furrow than your fellow citizens, but to develop the agricultural resources of the state of Minnesota and the whole northwest, knowing how to best, plant the seed to raise the future forest which shall break these terrible winds that sweep over us, and that you will be better prepared for all those things, and for the development and growing of fruits, and raising the future apple, and plum and strawberry, &c., than we have been.

I bid you Godspeed and thank you for the encouragement you give us by your presence here. (Applause.)

President Elliot. We have here with us quite a number of others that we would like to call upon but time will not permit

and we will call upon Prof. Prendergast to give us a few words of encouragement.

REMARKS OF PROF. W. W. PENDERGAST.

A fellow feeling makes us wondrous kind. My sympathies have been flowing out towards all these speakers because I see they have been over the same ground I have trod myself, and as Dr. Perkins was depicting the scenes that he had witnessed in schools of the early day the picture was marvellously like and familiar. The object of going to school in those old times among the granitic hills of New Hampshire, if we boys understood our business, and our minds were perfectly clear upon this point, was to hate the teacher, and we did our duty faithfully all through the Winter; from the beginning of school the first Monday after Thanksgiving until the closing day in March. (Laughter.) It must be admitted too that the teacher always gave us good cause. He never failed to encourage us in our laudable understanding. I remember one who, with a long alder rod would stand mid-way in the school room—this was a lady—and while a class was reading in front she would keep her eagle eyes glancing around into every corner in search of a victim—school teachers “have eyes in the backs of their heads” you know—and if an urchin looked off his book down would come the rod over his shoulders. At this another youngster would titter another too would receive a dose of the same medicine and so it went on from morning till night. Education, with us, was simply a drill in verbal memory. We were obliged to fill our minds with certain meaningless words laid down in the text book, to escape a thrashing. Our first business as I have said was to hate the teacher, which we did honestly and sincerely; and the second was to commit those words to memory, which duty was more often honored in the breach than in the observance. The questions were at the bottom of the page and as the teacher would ask them, we would cudgel our brains to call to mind what we had marked in the text as the proper answer. So we went on cramming with such dry chaff, an educational process about as sensible as the scheme of the dietist who undertook to fatten himself by feeding on the east wind.

I went into a teachers' institute of this state some time ago and as the teachers were ranged on their benches in the court house, the superintendent said to me “here they are waiting like so many jugs to be filled.” That man, it seems to me, had the same false idea. Education cannot be poured from one mind to another. The trees which beautify our fields and gardens do not get their

vitalizing sap in this way. It cannot be poured into their veins and capillaries from any overflowing vessel without, but the roots must strike deep into the fertile soil and gather in the life-giving fluid through a thousand slender fibres and send it coursing up the massive trunks, out through the sturdy limbs, to every swaying branch and quivering twig, to each tiny spray and trembling leaf carrying nourishment to every part. Boys must grow and develop like the trees. They must reach out with the fibres of thought, lay hold of and gather in, important truths, digest and assimilate, making them a part of themselves. Facts gleaned from whatever source, should be made the basis of protracted clean cut thought and of such additional conclusions as the students own intellectual strength and reasoning powers permit them to reach, acts are of value only as they can be used, and a boy with his head stuffed with a miscellaneous collection of them will never be in demand except as a cyclopedia. But when a scholar has been trained to seize hold of a few important ones, and, taking them for a foundation, to build upon them an impregnable superstructure, all his own, he has made a long stride in the direction of a valuable education. Such an one will go out of the school with his mind broadened and strengthened for the work the future will demand of him. If, on the other hand, we teach boys to be only imitators of others, whether in the horticultural, agricultural or any other line, and to know nothing of the work they are to do except as they have seen it done by others and under whose directions they have undertaken its performance themselves, they may achieve *skill*, but will never make *progress*, and whenever the conditions which surround them change, then skill, not being the offspring of scientific knowledge and mental acumen, cannot be turned to practical account. If we intensify their intellectual keenness and strengthen their judgment by careful analytical thought, each one as he steps out of the school, at the close of the year, will find himself decidedly in advance of the position he occupied at the beginning, and the world will look to him with confidence for something better than it could have expected under the word memorizing system of which we had the full benefit.

I remember the first time I made my way through the back woods of Minnesota. After walking fifty miles I looked upon that burned and desolate prairie and saw it stretching before me black as erebus dismal as Sahara and boundless as the sea and thought to myself what a work there is to be done here before this is fit to be settled up and cultivated by civilized man. Now, the people who set the fires which made the prairie so gloomy and forbidding

were savages and it was for us who took their place to inaugurate a better kind of life, a higher civilization on those prairies and the first white settlers who came began to cultivate the soil and instead of depending on the precarious results of the chase, substituted the raising of wheat and cattle thus standing upon a higher plane than the Sioux before them, and these who, not content with the mere necessities of life have sought to still further improve their condition by intelligent pursuit of horticulture and are now reaping the reward of that ambition in the enjoyment of comforts and luxuries and in the gratifications of aesthetic taste unknown to the simple bread-and-butter drudge have reached a still higher plane. The ones who have done the most to ameliorate the condition of the masses and make their life worth living have attained the loftiest pinnacle. It is the duty of those who are up, to lend a helping hand to those who are yet lower in the scale, to reach down and get hold of them and lift them up in the pure upper air of truth, purity and virtue which they themselves are breathing. This is what we are trying to do in this matter of education, and there is room for hope. I will say with the colored brother "The world do move." Today, we look upon the boys and girls in our schools not as culprits to be flogged into respectful obedience, but as gentlemen and ladies for the most part ready and willing to work harmoniously and sympathizingly with their teachers for the good of the school and the pleasure and profit of all.

The proper end of education is not to gain knowledge only, but to enable one to understand that the greatest happiness in this world comes from the consciousness of duty well performed. There is no burglar or professional pickpocket who, can truly say, that he believes the life he leads yields more enjoyment than falls to the lot of his honest neighbor. No, thieves and felons never know what it is to have an hour of calm repose or a night of sweet refreshing sleep. The temptation is strong to sacrifice our future happiness for a little present enjoyment. By yielding we sacrifice all the life that is coming for a trifling present pleasure. When we can get people to appreciate the world will be on the track to better things. (Applause.)

Prof. McLean. Allow me to say in behalf of the boys and those of the farm school that we very much appreciate the kindly expressions that have come from the society.

Prof. Pendergast, For myself and in behalf of these young men that have come from our school, I beg to say that we very much appreciate the work that the ladies have done. They are entitled to a great deal of credit, "so say we all of us." We cer-

tainly appreciate that excellent lunch they gave us this afternoon, and it will be a long time before we forget the good ladies of Excelsior.

Mr. Wilcox was then called upon for an essay replied as follows:

POTATOES, COST AND HOW TO MARKET THEM

By L. H. Wilcox, of Hastings.

Mr. Wilcox. Mr. President, ladies and gentlemen, I suppose I can occupy a few minutes here in filling up a little gap and so facilitate our business. I have prepared no paper upon the costs production and marketing of potatoes but will speak a few words from personal experience and observation. I call to mind a common expression of our old friend, Prof. Porter, in speaking of the building up of the agricultural interests of the university, and especially the farm school. He used to talk to us of the theory and practice of agriculture. Now, ladies and gentlemen, when we talk about growing apples, cultivating peaches around Lake Minnetonka, and describe in glowing colors what would be in the fruit interest, we are talking about the theory of horticulture, but when we come to the practice of horticulture, we are obliged to look to those articles for which Minnesota may become famous and which add to the wealth-producing power of our state, and in this list we find potatoes and certain classes of fruits. Now, when we talk of fruit in this society, we are very apt to forget the largest and best fruit that can be grown in the state; we are very apt to forget such things as melons and squashes, which are larger than the Russian apples ever will be in this state. (Laughter.)

But my topic is potatoes. That is a branch of horticulture. The culture of our vegetables this society, as a society, neglects, and if there is anything, during the past few years, that I regret, it is the fact that we have not given more prominence and more time in these meetings to the development and the advancement of the vegetable interests of this state. We all of us admire flowers; we listen with great pleasure to our learned entomologists and we give hour after hour to everything beautiful that is connected with horticulture; but in doing so we are apt to neglect the practical things which add to the productive value and wealth-producing resources of this state. Now, potatoes can be grown here successfully, and I might say that there is no part of the Union that produces that tuber with more perfect characteristics, of better quality and more productively than certain lands in the state of Minnesota. And the potato production is extending in the great Northwest. When our people, when the American cannot raise enough of the common vegetables, the common articles of life, to support our own people, when they howl about the protective tariff on everything of that kind, and import millions and millions of bushels from Europe and pay fifteen cents a bushel duty on them at that, is not that a sign that we neglect our own soil, our own state, and the most favorable conditions under heaven for the production of the crop?

The potato crop in Minnesota has become a crop of great value, and the starch manufacturing interest is centering now in the northwest. I have been out of the line of direct production for some little time, although last season I raised something over one thousand bushels in a small way, but to produce them successfully we must bring to our aid such intelligence as we use in producing other things that are not indigenous to our climate. We must use soil adapted to their cultivation, we must give it the best attention, we must plow deeply, we must plant properly, we must cultivate thoroughly, we must market judiciously, and then we are assured of profit, a profit to our pocket which contributes to the pleasure of our agricultural success. The first thing necessary, in the cultivation of potatoes successfully, is to have a moist, heavy soil, as we term it in this state. Our dry climate somewhat affects the production. This soil should be cultivated deeply, cultivated thoroughly, in furrows about three and a half feet apart, and planted about a foot apart in the rows, and covered; and do it as we can cheapest and best. The best way to do this, is to have a potato planter, because it is the use of machinery that makes successful agriculture available. A potato planter will plant for about a dollar and a half per acre.

I wish to speak a little of the marketing because the marketing of potatoes I am familiar with, having had a good deal of experience. The markets of our eastern cities to-day are receiving—I will not say the main part of their supplies,—but a large part of their supplies from Scotland, Ireland and Germany. I was in New York six weeks this fall, and found that the imports of Scottish potatoes were affecting the market materially, and that too, after paying the duty of fifteen cents a bushel.

In shipping to the eastern markets, there is one thing that should be impressed upon the farmers of this state. I have seen in New York this fall a thousand cars of potatoes waiting to be put upon the market, mostly from the Northwest, Minnesota, Iowa, Kansas and Nebraska, and I regret to say that hundreds of those cars would not have brought enough in the market to pay the freight and commission. Why? Because the shippers neglected to put them up in the way that the market demanded. In shipping to the eastern market we must sort closely, send nothing but perfect tubers that will command a good price and equal if not surpass the Scottish potatoes sent to those markets. That is the first thing and only thing necessary to ship to the eastern markets for profit.

The second great marketing place for this product of the Northwest that, with all things considered, perhaps will pay more than any other point, is the starch factories. The starch producing centres of New England have gone to decay, and the reason is that the potato crop there is proving a failure. Potatoes can be produced here in Minnesota at one-third the cost of producing them among the hills and swamps of Vermont, and starch which is necessary for certain lines of manufacture, and which is one of the prime articles of commerce of our country, must be manufactured in that portion of our country where the raw material—the tuber—

can be produced, where we can cultivate five acres as cheaply as they can one among the hills of New England. This fall our starch factories have been making a clear profit of about 10 cents a bushel on every bushel they worked up, and that too on a basis of from three cents to eight cents a pound for starch. I know a factory in our place that invested six or seven thousand dollars, and had made a clear profit of eight thousand dollars. I hope to see this thing develop and increase to the profit of our farmers, because there is another reason for growing them for this market. We can select any portion of the finest tubers and send them to the eastern markets, such as will command the highest price, but we can send to the starch factory all the refuse, anything from the size of your foot down to the size of a Russian apple, and it will bring a good price because it is just as valuable for starch.

DISCUSSION.

A Member. How do you cut your seed?

Mr. Wilcox. My way is to usually cut seed to about two eyes. I commence at the base of the seed. I have a peculiar way of my own which I do not want to take time to illustrate now. I cut to two eyes and when I plant I place each of those pieces, nearly as I can average, a foot apart in the rows.

(Mr. Wilcox demonstrated his method by cutting a potato.)

Mr. Pearce. Which do you prefer for planting, potatoes of large or of medium size?

Mr. Wilcox. The larger the potatoes you use the more vigorous stalk you are likely to get. If you cut large potatoes you are more likely to get what you desire, one strong vigorous stalk in a place. That is the only advantage, except that in the large tubers we have a more perfect development of the bud. The potato is practically a bud anyway, not a seed.

Mr. Folsom. How long do you recommend that the tubers be cut up before planting?

Mr. Wilcox. Last spring I tried some little experiments in that direction, but I regret to say that I am unable to report here because I took no means to inform myself from my notes before leaving home. I planted 15 or 20 bushels that were cut several weeks before and were thoroughly calloused, but I am not prepared to say which would produce the best results.

Mr. Barrett. Do you put the manure on the surface of the ground?

Mr. Wilcox. Keep the manure as near the surface as you can and cover it. I would spread it upon the surface and harrow it all I could, and work it in fine.

Mr. Barrett. How do you prevent potato scab?

Mr. Wilcox. The way I have succeeded in getting rid of it, is to reject the potatoes so affected as seed. I have not been troubled with it much since coming West. It don't think there were ten bushels out of the thousand I raised last year that were affected by the disease at all.

President Elliot. What kind of soil do you plant them in?

Mr. Wilcox. It was quite heavy clay soil or what the farmers there term grub land. I presume you know what it is.

Pres. Elliot. First or second crop?

Mr. Wilcox. It was the third crop.

Pres. Elliot. What were the two previous crops?

Mr. Wilcox. Corn., I think.

President Elliot. What variety do you recommend for early market?

Mr. Wilcox. My favorite heretofore has been the beauty of Hebron. The best market potatoes, for growing here, are what is called the "white star."

President Elliot. Mr. Grimes has grown a great many potatoes for market, and I think he can illustrate what his method is.

Mr. Grimes. Mr. President, in the first place in order to secure a crop it is necessary that you should have good seed. My manner of saving seed has been a good deal like the way some of our farmers would save seed for corn. When I found a hill with one or more specimens just such as I wished to plant, middling specimens, and perfectly healthy, I would throw them to one side between the rows and after the row was dry I would gather them up for seed. In regard to specimens, I neither select the largest nor smallest. Do not select your small potatoes as some farmers do, thinking if they are too small for the table they will do for seed. If you select the largest ones you will find the crop following will be inclined to be rough. They won't grow smooth and straight. You should select your seed from middling sized potatoes.

Now, my way of planting is to furrow out the land, have it nicely plowed, and run in and out in straight furrows with a plow. I would drop two pieces of seed in the hill.

In regard to fertilizers, if you want to raise a good crop of potatoes, I would use strong barnyard manure and all the ashes I could get, and just scatter it along my rows. My way of covering the potatoes, has been with a common three-horse harrow. The rows I usually plant three feet and nine inches apart, but sometimes three and one-half feet. Then, when you get your potatoes dropped along, you can go over the ground with your harrow and

level down, and most of them will be covered up. Then, when the planting is all done, I harrow it crossways, and there is scarcely a single potato left uncovered. I don't know what is expected of me, whether to go any further in the description of this process or not.

President Elliot. What is your next cultivation after that harrowing?

Mr. Grimes. I go over with the harrow again just as the plants begin to show up from the ground, and I kill all the little weeds.

President Elliot. What kind of a plow do you use?

Mr. Grimes. I use a common shovel plow.

Mr. Sampson. Can you give us any information in regard to scab?

Mr. Grimes. There is a disease we call the scab, but what you term scab is, perhaps, caused by the potato bug itself. If they suck the potato they will produce what is called scab. This year we have noticed very little of that, and the vines were troubled with these bugs only a little while.

In regard to the disease of potatoes, like produces like, and if you have planted your potatoes in the same ground several years, they are likely to become diseased and will run out. You can't avoid that disease in planting diseased potatoes, because it will reproduce itself.

Prof. Green. What is a fair yield per acre?

Mr. Grimes. About 400 bushels.

Prof. Green. Do you ordinarily get that?

Mr. Grimes. Not ordinarily. An ordinary fair yield is from 250 to 300 bushels.

Reports from the vice presidents were then called for.

REPORT FROM FIRST DISTRICT.

By Vice President A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen: These reports from five congressional districts, submitted to you each year, are supposed to cover the whole great commonwealth of Minnesota. Let us take a hasty glance at these reports, as given in last year, just to see how much encouragement we can muster, to continue apple culture in the same *old style*. From the first district you get an apology for not doing more. From the second, about the same. The third reports as follows: "Standard apple trees have about all gone to the brush-heap, and if there are a few lonely ones left, they will

soon die of a broken heart." Fourth district: "In apples, there seems to be little progress, or a desire to plant new orchards, as the old trees have about all disappeared." Fifth district.—"As far as I can learn apple trees in my section of the state are reduced to the transcendant, with a few hyslops, Becher sweets and Minnesotas." Under the pressure of this horrid testimony from all over the state I must ask you to either *impeach* these five witnesses! or refrain from denouncing the writer as a *crank* for *barking* so much about "Tree Bark"! sour crab apples! and the like. It is true that we are not on that solid basis that we hope ere long to be placed upon. Yet in spite of all obstacles thrown in our path, some few are still making apple culture pay in our district. I reported in my last that Wm. Somerville took \$125 in premiums on apples, at two fairs. This year he increased the pile some \$25. So you see the "*brush pile*" don't beat him much at present! And as he continues to set the *most worthy example* of planting a few of the *best hardy* trees every spring, and giving them intelligent thought and care, I doubt if the "*brush heap*" or any other obstacle will be too tall for him to surmount! Horticulture is steadily advancing, and keeping pace with the *times*, and the other arts and sciences. The native plum crop was cut by frost in some locations, but with me it was better than in any former year, in fact too good for the welfare of the trees. The Russian mulberry crop was also better than usual, some of which were larger and sweeter than the common *field pea*! The raspberry and blackberry crop surpassed that of '38 which was also good. We are favorably impressed with the Caroline raspberry; it is hardy and prolific, and although not of a fashionable color for market, sells well for a light berry. The currant crop was fair, the long bunch Holland leading all others with us. Gooseberry crop rather light. The strawberry crop was the poorest for many years, but may be all the better for that this year. We fruited the buffalo berry for the first time this past season, and look upon it as quite an acquisition. The potato was about half a good crop here—but so extensively grown everywhere that the market was slow at 20 cents per bushel. We had a fair yield of other garden vegetables and prices were low, too low in fact to correspond with prices on fruits.

"The banana belt." The banana crop was the largest and most superb ever produced since the settlement of the country. Aug. 23rd, '89, Mr. G. W. Fuller and self visited the green house connected with the Insane Hospital at Rochester, and took the following notes descriptive of a banana plant, brought to Rochester from Florida eleven years ago. Height of plant, 14 feet; circumference one foot above the root, 21 inches; length of leaf, 7 feet; length of fruit stalk, $4\frac{1}{2}$ feet; length of fruit, 6 inches. Has produced 492 specimens of fruit. Has 26 full grown specimens now on plant. It has been exhibited before the S. M. Agricultural Society for three years in succession. I made a visit to this plant again about a month later, and the florist in charge informed me that it had produced over 600 bananas and all dropped when about an inch in length except 26 yet hanging on the plant.

REPORT FROM SECOND DISTRICT.

By Vice President Alfred Terry, of Slayton.

January 21, 1890.

The season of 1889 has been, in Southwestern Minnesota, so far as horticulture is concerned, a varied one—with little snow and a dry soil during the previous winter, heavy mulching was necessary and those fruit growers who had neglected it lost considerable fruit. March was a spring month; by April many small fruits were budding. May was cold and a few severe frosts killed raspberries that had not been cared for as before mentioned. Currants, too, suffered much and grape blossoms were entirely destroyed except where they were blanketed. The first mulberry blossoms (which makes the best fruit) were all killed. We cannot urge upon our people too much, the necessity of heavy winter mulching. Put it on when the ground is frozen, and if possible, before snow comes; put it on thick and wide, that the frost may be kept in the ground longer in the spring. We have magnificent summers for fruit and flowers but we must keep the plants dormant till the frosts are over. The few rain showers which we had during the growing season were all local rains; and in consequence gardens varied, some producing as luscious fruit as ever, while in others the fruit had lost the rich juiciness which makes it so palatable.

Reports come in from my district of indifferent crops of all kinds and at Windom, where there is a gravel subsoil, of entire failure. On the other hand, I have had very good success with most small fruits, thanks to the mulching spoken of before. Our new member, Mr. James Taylor, succeeds well generally, and did so this year with the exception of raspberries, the late frosts in the spring killing them in the bud. I have the Russian Apricot thriving well in my orchard; they have seen three winters there and no part of them have frozen back.

A great deal of practical religion and a little horticultural patch on every farm in Minnesota would make this state such a veritable Eden that all nations would call us blessed.

REPORT FROM THIRD DISTRICT.

By Vice President M. Cutler of Sumter.

Mr. President, Ladies and Gentlemen:

The past season has been quite discouraging to the horticulturists of the third district. Last winter was so mild that spring opened with all kinds of fruit trees and plants, except Turner raspberries, in a promising condition, and so they remained until the close of May when several heavy frosts nearly—and in some cases entirely—ruined our prospects. To go over the strawberry and

blackberry patches was enough to discourage the most stalwart horticulturist. But it seems that from nearly all misfortunes we can learn some useful lesson, or get some theory or idea confirmed, and in this case there is no exception to the rule. For instance, our strawberries that were not mulched were in full bloom and nearly all destroyed. Those uncovered about the 1st of May were badly injured, while those uncovered about May 10th produced about an average crop, so that we harvested about 1,400 boxes that sold quickly at 12½ to 15 cents per box. We had An. Briton, Taylor's Prolific, Stone's Hardy and Snyder in bearing. Ancient Briton and Taylor's Prolific yielded the best, and were least injured by frost. All were badly injured by drouth, so that we got but 400 boxes from ½ acre.

All the new growth was in fine condition last fall and is well covered.

Owing to the blight the previous season red raspberries were a failure in our district, so far as I know, most of the canes being dead in the spring.

Grape vines generally produced well. The Worden for quality and earliness is taking the lead and produced some very fine grapes last season. Concord yielded well but was not fully ripened when the frost came.

Of the new kinds of fruits tried by us the past season we report favorably on Bubach No. 5, and we think Jessie will do well.

Crabapples were scarce except around Hutchinson where they were quite plenty. There are some crabapple orchards around this town containing large trees in fair condition.

Wild plums produced a fair crop but seem to be rapidly disappearing.

• APICULTURE.

This profession had more novices added to it the past season than ever before. The air was full of bees. The old pastures and roadsides were covered with white clover blossoms and the Linden was loaded down with bloom.

One old gentleman's single swarm increased to eight, six of which he assured us were in good condition for wintering. Surely this is destined to be a land flowing with milk and honey, with strawberries and cream thrown in.

Mr. Barrett. I think you had better waive my report for this reason: I didn't understand my duties at the outset, and have not been able to cull those facts that are necessary to give the required report. I cannot say anything further than I have said, but if the executive committee insist that I make a report I will furnish one in the future.

Mr. Wilcox. At the last meeting of this society one year ago after we had considered the advisability of extending the good influences of this society and trying to give outside horticulturists some of its advantages, a motion was made to amend the constitution in such a manner as to give auxiliary societies, that were in-

terested enough to send three delegates here, all the rights and privileges of membership. In short, it was to encourage local societies and try to build them up. It was my privilege to serve with Mr. Underwood on that committee, (I don't recollect now the name of the third one), and we proposed this amendment to the constitution: "Local or county horticultural societies and kindred organizations may become auxiliary to this society and their members entitled to all the rights and privileges of membership by sending three delegates," etc. We thought that a society that wasn't interested enough to send three delegates here wasn't worthy to act as auxiliary to this society, and so we reported it in that manner.

That was brought up and adopted, and why I speak of it in this way is to give a clear understanding of this because I don't think the members of our horticultural societies appreciate the advantages which we give them, and I speak about it to call their attention to it. I was talking with a prominent man the other day and inquired why his society wasn't represented here. He said unless it gets aid from the State society it will go down. I explained to him about sending delegates. He said he did not understand that. Now, this is why I am calling particular attention to it. That was the amendment and it is worded as plainly as English can be; it gives to all societies that send three delegates and furnish a report of their proceedings to our annual meeting the rights and privileges of membership.

REPORT OF THE FINANCE COMMITTEE.

Mr. Latham. There is no formal report prepared by the executive committee, but we have examined the treasurer's report and his books and found them correct in every way; also the secretary's financial report.

The finances of the society are not in quite so good a condition as we could wish. The close of the year found us in debt something like \$128, and it took the first drawing of the half of this year's appropriation to enable us to pay our obligations. It would seem as though we shall have to have a little more appropriation from the state or else cut down our expenses a little.

The committee made two or three recommendations in the way of suggestions that the society might act upon if they saw fit. One was in the direction of asking the president to take steps to ascer-

tain what rights or power we have in reference to the \$500 still in the state treasury—whether it is available for us to use. The committee do not understand whether that can yet be reached.

Also to endeavor to secure a different ruling from the secretary of state, or whoever has this matter in charge, in regard to binding in cloth our annual report. In the past they have ruled that the law contemplated the binding of the report in paper; and this year, and I think last year, but anyhow this year, it has been paid for mainly by the society. That accounts for the indebtedness and about makes up the amount we are behind. It was the intention to bind a portion of the reports in paper and a portion in cloth, but for the sake of getting them all bound in cloth there was a new law passed, but there seems to be something wrong about it so they don't bind them all for us; they give them to us in paper.

It is suggested that the secretary should put in at least four months' time during the year for work for the society.

Mr. Cutler: I would inquire in what way the secretary should put in his work.

President Elliot. If it is to be inferred from this that our former secretary has not put in the right amount of time, I want to say that Mr. Hillman has put in a great deal of time in the arrangement of the reports, during each of the years he has held the position, and I think I would not want to have anything of that kind go into our report and I think it had better be stricken out entirely.

Mr. Wilcox said that all the members of the society had in every way the highest regard for Mr. Hillman, and he was such a valuable man that he could not continue to give four or five months of his time to the interest of the society, for the sum of money he had been receiving. When we consider the state of our finances and the demands that are likely to be made upon them, and consider the fact that something must be done to sustain our local societies, we see no other way of doing this work except by putting upon the secretary some of this work.

Col. Stevens. I do not think you can get a secretary who will spend four months in the year of his time for \$500; I don't think there is a man who is capable of acting as secretary who would do it. It is well known that Mr. Hillman has done his duty in every particular. He was determined not to accept nomination this year. I venture to say that he has labored more hours for this society than any man who has ever been secretary, or ever will be, for the trifling sum of \$500. Now, he will not be secretary any more; he utterly refuses to accept the office. He has done this society great good, and I don't believe you can get a man that will

act as secretary for \$500 if you are going to make him work four months in the year. If you do, I venture to say the next year he will ask for a raise in salary. I certainly would not put any restraint upon the secretary.

Mr. Latham. It was the full understanding on the part of the committee that Mr. Hillman would not accept the office, but this was intended as a guide and direction for the new secretary, whoever he may be. It is meant as a warning to him that we shall expect such work from him and, if the person elected does not feel like putting in such an amount of labor, as the wants of the society demand, there should be an understanding in regard to that. It is not a reflection upon Mr. Hillman at all.

Mr. Gibbs. I want to explain one matter in regard to printing reports. I drew the bill. The language of the bill was "There shall be annually printed and bound thirty-five hundred copies." The bill authorized the binding in cloth of the whole edition and it did not provide for paper covers. The bill was passed through both branches. The question was raised by Senator Pillsbury as to the meaning of that term. I was present at that time and agreed on behalf of the society that we would take one thousand copies in cloth and the balance in paper. The bill was then passed in that form. That arrangement was carried out while I remained as secretary and no one raised any objection to 1000 copies being bound in cloth.

Mr. Barrett. If the person whom we may elect for secretary, whoever he may be, is willing to go out and work three or four months on a salary of \$500 we certainly ought not to object. It is a very small sum and the man who does it will do it under great sacrifice.

Mr. Cutler. I move that the report of the executive committee be accepted and adopted.

Seconded and carried.

ELECTION OF OFFICERS.

It was moved by Col. Stevens that Wyman Elliot act as President.

Mr. Elliot. Before that vote is cast, I wish to say one word. There is nothing that suits me any better than this class of work. My heart has always been in horticultural work ever since I was a small boy, but there is a limit to all things they say. I have served

you four years and I think that someone else should step in now and take my position, someone who shall take the work up where I leave it, and do it much better than I have done. I hope you will see fit to take someone else for this position.

Mr. Barrett. I do hope that Mr. Wyman Elliot will not resign. He is thoroughly posted in this work, has had long experience, and we have perfect confidence in him. He is able and capable and he can lift up this standard and carry it on to victory. I plead for Mr. Wyman Elliot as our President.

Pres. Elliot was then reelected by a unanimous vote president the year 1890.

REMARKS BY PRESIDENT ELLIOT.

Kind friends, I thank you very much for this recognition of the services I have rendered in the past. I hope in the future I shall have the hearty co-operation of every member; that every one will feel that what is to the interest of this society should be taken hold of and given encouragement. I hope you will all feel, as I do, that if there is one thing in the state of Minnesota that needs looking after it is the horticultural interest. We have each and every one of the older members tried to do a little, in our feeble way, but unless we have the hearty co-operation of the rising generation, these young men and these young ladies, and the boys and girls that are following us, we shall make but feeble effort to bring to perfection what we are aiming at. I hope each one of you will feel a responsibility resting upon yourselves and not upon the officers of the society alone.

It is hardly worth while for me to point out the difficulties of past service, but let us aim to reach forward in the future to something higher, and let us do all we can for the best interests of the greatest number. We are all well aware that we have our imperfections. There are some things we can do and do right. There are other things that we cannot, and we have to seek guidance and direction and do the best we can. We have to look for guidance from Nature's laws, and get instruction from those people who are better posted than we are. I feel myself, when I come to look through the reports of the different societies we are exchanging with, that the older I grow the less I think I know, and if we can all feel that way, I think we can do good work, and do more than we are doing now.

There is one improvement over last year. I think that our coming report will show that we have a greater number of reports from committees than ever before, and I must say that as I have looked over them very carefully as they came in, some good ideas have

been expressed, and I hope each and every one that has anything to do with this society, will feel that it is not only for their interest but for our interest and for the interest of the people of the state at large. If we could all live on from year to year and were all guaranteed that we could live as long as Methuselah, perhaps we could work out some of the problems we have undertaken, but we have soon to lay this down and let the next generation take it up where we have left it. We have been gaining strength from year to year, and although we have met with things that were hard to overcome, we have kept up good courage, and I hope if our courage holds out we shall be able to come off victorious.

OFFICERS FOR 1890.

The following list of officers were duly elected:

President—Wyman Elliot, Minneapolis.

Vice-Presidents—A. W. Sias, Rochester; Alfred Terry, Slayton; O. F. Brand, Faribault; M. Pearce, Chowan; J. O. Barrett, Brown's Valley.

Secretary—Samuel B. Green, St. Anthony Park.

Treasurer—Ditus Day, Farmington.

Executive Committee—A. W. Latham, Chairman, Excelsior; J. S. Harris, La Crescent; J. M. Underwood, Lake City; L. H. Wilcox, Hastings; Milon Cutler, Sumter.

Librarian—Samuel B. Green.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

LIBRARY OF THE SOCIETY.

Dr. Frisselle inquired how large a library the society possessed and where it was.

President Elliot. Our library is in a pretty demoralized condition just now. We had it over in the agricultural building. It was in that building when it caught fire and was somewhat injured by water but not by fire. I went over there and took a two-horse load of the most valuable of the books over to my barn connected with my office, and dried them out there the best I could, now I have them packed in a case. The remainder have been put in the coliseum building and there they have remained, so that our library is in two places. Mr. Cuzner, in his report as librarian, said he had been trying to get some place at the university but as yet had not accomplished that object.

The report of the library committee has not been given. Mr. Stevens, Mr. Hillman and myself were that committee. I have prepared a short report which I will read now.

REPORT OF COMMITTEE ON LIBRARY.

By President Elliott.

After canvassing the situation and looking up several schemes for locating our horticultural library without discovering any place that was suitable or available, we have come to this conclusion: That for the present we had better store our books in some secure place and wait for developments. There is some prospect in the near future of new state buildings being erected, and whenever that does occur, we must make application for fixed and permanent headquarters for a library-reading room and fixtures. We recommend the secretary to procure insurance on our library at the best rate possible, to the amount of five hundred dollars for three years.

In the mean time, before new quarters are secured, every member interested in this society should feel it his special duty to secure every paper, pamphlet, report, or publication that in any wise relates to the past or present horticultural literature of this state, and biographies of those who have at any time been instrumental in forwarding or encouraging horticultural enterprises of any kind. These should be secured and placed in charge of our librarian.

Dr. Frisselle. In order to make this library of any value to the society, it should be placed in some condition or position that it may be used by the members. I notice that these publications are simply reports that want to be put in some place. It seems they have been exposed to fire once, and they may be again. They are scattered about, as I understand it, part up in Mr. Elliot's barn and part in St. Paul. I would suggest that, if it is possible, a place in the Minneapolis public library be secured for keeping these books belonging to the State Horticultural Society. The building is fire-proof; it is large, and I think accommodates quite a number of different societies with a place on its shelves for their books. The Minnesota Academy of Science has its books there, and the Hennepin Medical Society, and also other societies.

THOUGHTS AND EXPERIENCES IN GROWING MELONS.

By J. A. Sampson.

I wish, ladies and gentlemen, that I could set before you a treat of some of my best musk melons, or, more properly called cantaloupes of the yellow species, with which I have had very good success. In all my gardening I study and work to obtain the very best.

MUSKMELONS.

My stock of yellow muskmelons are from the surprise melon, slightly crossed with the Casaba. I tried to obtain a new variety some years ago, by taking seeds from the surprise, pineapple, Cas-

aba, and the old fashioned long yellow muskmelon, and mixing them together. I planted the seeds in a field by themselves, and obtained a very good hybrid, but it was not satisfactory; the flesh was rich in flavor and sweetness, but liable to be too soft. I once tried to obtain the flavor of the pomegranate, with partial success. I find it hard work to keep several varieties of melons and keep each variety pure. As regards varieties, I consider the banana melon a choice acquisition. Of the green varieties I would mention the pineapple and the Casaba. The latter is a large melon, and consequently a little later in ripening. I always save my seeds from the best melons. If, after cutting a choice looking melon, the flavor is not satisfactory, I discard it as worthless. I don't allow any squash, pumpkin or cucumber to grow near my melons. Muskmelons require dry, warm weather to ripen in, in order to give the best results. Wet weather is liable to make them crack open or rot, and also decreases their richness. Cold weather causes them to ripen in the inside and get soft before the outside shows any signs of ripening. I say this especially of the yellow varieties.

HOW TO PLANT.

I select a southern slope if possible, dig holes about six feet apart and a foot square; put in each hole a shovelful of well-rotted dressing, and then take a potato fork and stir the dressing and dirt together; then put a little dirt on top of that. The hill is now nearly level with the ground around it, and I am ready for the seeds which I have had soaking for three or four days. I put about a dozen seeds in each hill, scattering them around so as not to be too close together, and cover them about $1\frac{1}{2}$ inches deep. As soon as the melons are up, I begin to look for cut worms, which are a source of much anxiety to all melon growers.

WATERMELONS.

I have not given as much study to the growing of watermelons as I have to the growing of muskmelons. Watermelons seem to require a different soil and climate to be grown to perfection. They require more moisture in the soil, and I don't know but more above it, although I have had some very good success in growing watermelons. They are sometimes liable to run off on two legs although that difficulty has not prevailed to any great extent among my melons. I have had the best success in growing when I planted near a sag in the ground or near a pile of dressing that helped to hold the moisture in the ground. I have been growing a variety that I called the early long watermelon. They are of medium size, rather long and dark, being slightly striped; the flesh red, seeds of a reddish brown cast, the rind very thin. Very early but liable to become mealy if left on the vines too long. I think I can recommend the Hungarian for quality and earliness against any other variety for the state of Minnesota. They seem to be very uniform in quality, and remain solid for some time. In planting I prepare the hills the same as for muskmelons, and soak the seeds about the same number of days.

DISCUSSION.

Mr. Miller. What do you do with the small squash bugs?

Mr. Sampson. I try to destroy them. I have tried different plans in doing it. I have tried the planting of beans in the hills; I have tried ashes, but the best process I have tried is pinching. I am not very thoroughly versed and there are others here better prepared to give ideas on the handling of insects than I am.

Mrs. Kennedy. Do you ever try feeding them on milk?

Mr. Sampson: No, but I read of a squash one time that was fed with milk and upon cutting it, the inside was found to be solid butter. (Great Laughter).

Mrs. Kennedy. That would be quite an improvement. There is a gentleman who lives on the prairies west of us, who said that the way he raised them, was to take a pan of milk and put the joint of the vine next to the melon in the pan of milk and in twenty minutes it would absorb all the milk.

President Elliot then read the following paper:

HOT BEDS.

By E. Nagle, of Minneapolis.

A little may be said about the hot beds. Perhaps most of you know how to make hot beds, but there may be some of the members of this society that do not know, therefore it may be well to explain how to make them and how to take care of them.

There are different methods of making hot beds. The old way is to dig a hole or pit in the ground the size of the bed you wish to make, and board it up; have it about two feet deep, five feet wide, and any length, according to the amount of sashes you have; run it east and west so as to have the sashes slant to the south to catch the full rays of the sun—the north side should be from four to six inches higher than the south side.

After that is finished and you get ready to start the hot bed take good, fresh stable manure and pack it in evenly; fill up within six inches of the top; place the sashes on and let it heat until it is heated enough all over the bed evenly, then tramp it down and if not full enough, put on some more manure; then put on from three to four inches of good earth (taken from the pile which should have been covered with manure in the fall so as to be accessible it when it is wanted.) Then let it stand again with the sashes on until it is again heated, which will be in about two or three days. Then a thermometer should be put in the earth and if it is not over 90 degrees it is ready to plant in.

Another and a better way to make hot beds is making them on top of the ground. In this case it is only necessary to make boxes or frames. Take two boards, any length to fit the sashes—the back board should be about eighteen inches wide and the front twelve or fourteen inches. Then saw them of a length to fit four or five sashes—(the hot bed sashes are usually five feet long and three and a half feet wide). Then nail the end pieces on and strips across for the sashes to rest on and the frame is complete.

Now take good, fresh stable manure, spread it evenly over the ground about twelve to eighteen inches thick, according to the time the hot bed is made, if early in the season the manure should be thicker so as to hold the heat longer. Tramp it down, and put on the box, the higher side toward the north, so that it will slant to the south. Then fill the box up almost to the top; tramp down again; put on sashes, and bank it up all around so that it may become evenly heated all over the bed. After that, treat just as in the former method. Seeds may be planted in the beds as soon as the temperature is right—say from 80 to 90 degrees, but it should not be over 90°. Potted plants should be plunged in the earth.

Care must be used in watering; it must be done on warm days and near the middle of the day so as not to freeze the plants when watering them. At nights the sashes should be covered either with boards, matting or coarse manure, so as to keep the cold out.

Very careful attention must be given to airing the plants on bright sunny days. They should be opened for a little air in the middle of the day, but the sashes must be raised so as not to let the cold wind blow directly on the plants.

Hot beds may be started any time from the middle of February until the first of April; for amateurs it is best not to start them too early.

SUGGESTED CHANGE IN AWARDING PREMIUMS.

Dr. Frisselle. In the offer of premiums by this society, it seems to me we have some large premiums offered. For instance, premiums have been given as high, I think, as \$20 for the largest number of varieties of grapes. There are very few varieties that are grown in this state. When you have mentioned the Concord, Delaware and Moore's Early you have got pretty much through with the varieties that are of any special value and we should be very shy in planting any large number of other varieties. Now, I think, Mr. President and gentlemen of this society, that we might with propriety offer a premium, for instance, on the largest patch of raspberries, say 500 or 1,000, and have a committee appointed to visit any who offer such patches for premiums; also on vineyards, that there be a good round premium offered for the best vineyard. This would encourage the growing of vineyards. The same might be said of currants. The man that has the best 500 currant bushes,

• makes the best production, let him have a premium if they are worthy of it. I think it would be for the interest of horticulture in this state to have some premiums of this kind offered, rather than have large premiums offered for the largest number of different kinds of grapes brought in here. A man might plant twenty kinds of grapes and bring them before the society and the society would give him \$20. Year after year that same man would come forward and take the \$20. I don't know whether this has ever been done or not. This is not of any value to horticulture in the state. Now, I would ask, Mr. President, that some action be taken, relative to this matter by the executive committee or whoever has the matter in charge. It would not be a difficult thing for persons appointed upon the premium committee to visit the vineyard, and raspberry patches, and all, at one time. The same course should be pursued in regard to onions, potatoes and corn. I think we can make improvements in this direction, and I would like to hear expression from other members of this society on the same point.

I move the subject of premiums upon patches of raspberries, currants, vineyards and everything of that sort;—that premiums upon these be offered by the society, and that the whole matter be submitted to the executive committee. I suppose that is where it truly belongs.

The motion was seconded and carried.

QUESTION BOX.

"Can we in the state of Minnesota compete with Kalamazoo in raising celery?"

Mr. Allen. I ask that question myself. It is a great question in my mind whether we can or not.

Mr. Wilcox. Mr. President, my opinion is very positive upon that question, as well as upon very many others, and from two years' experience here, I am very positive that we can compete with Kalamazoo or the world. They don't grow any first class celery. All we need is proper location. I failed this year in raising celery, because my place is too dry. To raise celery successfully we have to go into marshes. My friend Mr. Featherton, had quite a little piece this year, and while it was too dry for the purpose, he had the finest celery in quality I ever saw.

Mr. Sampson. I have had a little experience in raising celery. My first experience was some years ago, when I planted somewhat early in the spring. I took the best care I knew how to, of it, and

I had about the success brother Wilcox has reported. The ground was too dry. I was a little discouraged, but thought I would try it again. The next year I took some very deep loam—deep and moist—made some trenches about 20 rods long, and put the boys to setting plants along those rows. The next day the sun came out very hot. That was a damper. I waited till there came another rain, and I set them out again. About four or five days after, there came on one of those heavy showers, and all the plants that were not washed out were buried up. I don't suppose, in those rows, there were more than thirty or forty plants. The following year I didn't plant any celery. I calculate to put in an acre or two, the coming year, and I expect to raise, maybe, two or three hundred dollars' worth. As regards quality, my customers are well pleased, I think. They say it is good.

Mrs. Kennedy. I have never tried to raise celery, but one of our merchants asked me, the other day, if I had tried it. He told me that he had raised lots of it, and made more money out of it than anything else in his garden.

President Elliot. Now, if there is no one else who can give any experience, I want to tell you what I don't know about raising celery. We have at Minneapolis one of the most enterprising Germans that I know of in the northwest, in regard to raising vegetables. That is Mr. Busch, of Richfield. He has been growing celery successfully for several years, but this last year the drouth beat him. He was raising it on high ground, that is, it was not called high ground, but it was medium dry ground. This year he has put into market celery with the whole bunch about as large as my little finger, with about three or four little slim sticks. It was a perfect failure this year, on account of the drouth. The consequence is, he has made a loss. Now, I have in mind another German, who has been working for the last four or five years, trying to develop the celery industry in his way. He is located somewhat differently, being on the side of what used to be a pond or lake. That lake he drained, took the water off, and it came into grass. There was one portion of it (a little arm) that was not so deep as the rest, and he has broken that up, and this year put it in to celery. At the time I was there, which was in the driest part of August, the roads were very dusty, and everything seemed to be wilted down, but withal, he was digging magnificent celery. He had celery with bunches as big around as my cuff, magnificent bunches, I never saw finer. To look at the soil, you would think it was nothing but dry peat, without any moisture in it; but if you were to scrape off the top, and take up a handful of the soil, you could squeeze water out of it;

now, that is the kind of a place to grow celery in, to compete with Kalamazoo or any other country. It is a crop that cannot be grown successfully on uplands. This man told me that he had put on forty loads of manure to the acre, just spread it right on and worked it in. If it had been a wet season he would have had a ditch, so that he could drain it. That is what you need in cultivating land of that class; you must have ditches so that you can take off the surplus water. The celery was just as white as a hound's tooth.

Mr. Wilcox. You have described the Kalamazoo land and system of draining it, exactly.

Prof. McLain. We grew twenty or twenty-five kinds of celery at the station last year, but it was not much of a success. Our soil is not the kind we need. I know that celery, under such conditions, cannot be grown at a profit, and I do not see but that what you have said settles the matter.

Mr. Allen. Don't they take off two crops a year?

Pres. Elliot. Yes. We have the advantage that our crops here grow much faster than theirs. There is one other point, and that is in regard to price. Mr. J. F. Heldgrew was competing with Kalamazoo celery all along last summer. While Kalamazoo celery was sold at 16 cents, he was selling his at 35 cents, and was getting 60 cents for his large roots. He was getting as much for one root as they were for four.

Mr. Wilcox. In visiting the Kalamazoo beds I was informed that if they could market their celery for 12 cents a dozen, which is about one-third what our celery brings here, they could count on a crop worth five to seven hundred dollars an acre.

Prof. McLain. That same thing applies to the growth of all kinds of vegetables. When I was in Kansas I was much interested in horticultural work there, and the originator of the Hopkins variety of strawberry was an old friend of mine. While you might say it was hard for the people of Kansas to compete with the Southern Illinois strawberry growing counties on account of their superior facilities, still Mr. Hopkins took his high priced land, land that was worth a thousand dollars an acre; went down to the slaughter houses and got a remarkable fertilizer from the packing houses, and he grew a quality of strawberries that he could get twenty-five cents a quart for, when other strawberry growers were only getting 12 cents. He told me he never sold a quart of strawberries for less than twenty-five cents. The freshness, crispness and excellence of the fruit that he sent to market, put the Northern grown stuff at a great disadvantage. I mention this because it applies to all vegetables. I do not think that the

disadvantages. we labor under ought to deter us from making earnest effort to realize from the results of our labor in this line, because we have competition. Competition is easily enough overcome with a more excellent article.

Dr. Frisselle. I would add one word, especially to the remarks made by Prof. McLain on the value of fruit and vegetables or whatever we have to send to market. It is a good thing that brings a good price, and it is utterly useless and foolish to cultivate in a slack way and bring into the market that which is not first-class. To illustrate, I would say that I have taken some little pains in the cultivation of currants and last year I took a good deal of pains to have them carefully picked and put in nice, clean packages, and the result was I found no difficulty in selling my currants at four dollars per bushel standing right along with others that brought only \$1.50. I could sell one hundred bushels at that price. That simply marks the difference between good and poor grown fruit, and the difference is that margin which a person gets who does good work.

Prof. McLain. Will you please add to the good article, the good article put up in attractive shape.

THURSDAY EVENING SESSION.

JANUARY 23, 1890.

The meeting was called to order by President Elliot.

A musical selection was then rendered by the young ladies.

President Elliot. I will say that this paper is prepared by an amateur in Minneapolis, a young lawyer. He expected to be here to-night, but on account of sickness in the family he could not leave, and, being a particular friend of his, I have offered to fill his place, but I assure you, I cannot do as well as he would be able to do.

GROWING HOLLYHOCKS.

By F. H. Carleton, Minneapolis.

For an amateur to speak on any horticultural subject, in the presence of some of the veteran horticulturists, who are members of this society, seems presumptuous. As I glance over the names of the members of this organization, I read those of many who have made seed sowing and plant life a profound study for many

years, and to whom soils and climate and hybridizing are familiar subjects. The discovery of a new variety, or the adaptation of particular varieties to our Minnesota climate and soil, has been to them the gratification of ambition and the result of careful investigation. I should remain silent were it not for the conviction I have, that nothing affords so much pleasure to the mind, as the cultivation of the soil; whether it be to the man of many acres who makes it a life work, or to the amateur with his few rods of earth. As a life work, or as a mere recreation, the study of seed sowing and plant growing is always interesting. It is particularly, so to the business and professional man, and it affords a far greater degree of rest and enjoyment than anything outside his profession, to say nothing of the renewed health, both to body and mind, which it gives. Call it a "hobby" or a cranky notion, or call it what you please, the man who has never sowed seeds or cultivated a plant is to be pitied. Every hard working business or professional man should have a "hobby" outside of his regular routine work, and to my mind no field is more worthy of his recreation than horticulture, no field has more unexplored regions or greater possibilities, and in none can the best minds and the most thorough investigation and study be more pleasantly and profitably employed. Nothing outside of revelation can bring him nearer to the giver of all life or show him more of the providences of the great creator.

By the programme I see I am to speak of "growing hollyhocks", although I had hoped my subject was to be of a somewhat wider range, and include hardy flowers in general, rather than hollyhocks alone. If a moments digression may be allowed, I would like to insert a word in favor of hardy plants and biennials in our grounds and gardens. It has occurred to me every summer while taking in the beauties of massed beds of geraniums and coleus which decorate so many homes, and while viewing the rich collections of asters, balsams, stocks, sweet peas, and many other annuals,—in favor of which favorites no praise can be to great—that the more hardy plants were being overlooked and neglected. While I would still cultivate the annuals and tender plants, and regret that so many lawns and gardens have not even a single geranium to gratify the eye, yet I would add to them the beauty which comes from the hollyhock, the Clematis, the Iris, the larkspur, the Canterbury-bell, the *Lilium auratum*, the sweet William and the perennial Phlox,—nor would I overlook the gladioli, the dahlia and the *Amaryllis atamasco* or fairy lilly, the Canna and the *Caladium* with their bulbs and tubers, so easily removed and kept through the winter in our cellars, as to make them for all practical purposes, perennials. The perennials and biennials, if wisely selected, will afford a series of bloom from the early spring to the time of hard frost,—and they have a vigor and beauty of coloring which cannot be surpassed. Whether as single plants, or scattered in the border, or massed, they are always robust and striking. Blue is a rare color among the annuals and where can you get an intenser blue than that of the larkspur, or a prettier shade of blue than is found

in the Campanula and Canterbury bell and Clematis, or a finer purple than that of the dahlia? What magnificence and variety of coloring can be found elsewhere than in the gladioli or dahlia? What flower is equal in magnificence to the *Lilium auratum* or Japan lily, or what more graceful and delicate than the lily of the valley? Let us have annuals, but let us not forget the biennials and more hardy plants—remembering that they give a variety and picturesqueness to the garden or lawn which no annuals can. And the biennials and perennials are so permanent,—so easily increased by division of the roots and by seeds, so easily moved and transplanted, and without the cost of buying each year a new set of plants.

But of the hollyhock—the plant which we can still see with the eye of memory standing in stately vigor in the gardens, cultivated by hands long since passed away—the old-fashioned hollyhock with its large single flowers which stood above our heads while children, in far away gardens, what shall we say of it? True, it is old-fashioned, but as I recall my last year's garden with its fifty or sixty stately hollyhock plants, running through all the shades of red, crimson, rose, buff yellow, salmon, white, purple, maroon and almost to a black, and the beautifully fringed and variegated Japanese varieties, I remember that a bed of dazzling *Sam Sloan* geraniums and two or three beds of choice asters, *Victorias* or *Truffaults* peony, would scarce occasion a glance from the passer by, but those hollyhocks, standing from four to seven feet high, would attract the attention of all, and cause many a backward glance and lingering step, and excite many an exclamation of delight, and many a request for a single flower or for seeds later on. And so I affirm that if you raise flowers to brighten your gardens, or to brighten the faces of those who pass by, no flower excels the hollyhock. You can prune it and keep it low and bushy, or confine it to a single stately stalk, or mass it and make a dense clump of beauty. You can raise, if you wish, the old single variety, to remind you of the garden, in the home of years ago, cultivated by fathers and mothers who have long since laid aside the trowel, or you can fringe the edges of the old-fashioned flower and variegate its center with different colors and thereby have the Japanese varieties, or you can have the semi-double, or you can have the complete double flower—as large as the doubled up fist. The same hybridizing skill as has developed the chrysanthemum, the gladioli, the dahlia and other plants, has also developed the hollyhock; it has ceased to be an old-fashioned flower and has, in reality, become a modern flower. Within a few years it has become a popular summer flowering plant, and when planted in a rich soil and sunny position it is a very impressive and stately plant. I know of no plant whose flowers so perfectly combine large size and delicacy and variety of coloring as the hollyhock. Its flowers, when well cultivated, are fully as double and almost as pure and perfect as the camellia. It has ceased to be coarse—the pure white is beautiful; the delicate rose and pure yellow are very handsome; the shade which almost reaches a black is found

in no other flower, to my knowledge, while the shades of salmon, crushed strawberry and old gold, are almost new, among flowers. Chater's twelve separate colors show how many different hues and shades can be produced in the double varieties alone, saying nothing of the old single varieties and the variegated and fringed Japanese.

As to the culture, it is easy. Sow the seeds in the spring in good rich soil about half an inch deep. After the young plants are an inch or two high thin out or transplant (and they are almost as easily transplanted as cabbages) to six or eight inches apart. Then in September or early October, or early the following spring, set them where they are to remain, in a sunny position, in rich soil at least two feet apart. I have never seen well mixed soil too rich for them. The plants will take a good quantity of water provided they are soaked when they are watered, they should not be watered too often but thoroughly soaked when they are watered. I have raised them for several seasons, and carried them through all sorts of winters, and have never found any trouble in wintering them; always taking care not to set them out in a hollow place in the garden where the water could accumulate and freeze around the roots, and covering them through the winter with a light covering of coarse litter, generally the dead stalks of other flowers and leaves. The covering should be so light as not to exclude all air. My experience is that most persons cover their rose bushes and hollyhocks too heavily, thereby excluding all air; and then uncover them too early in the spring. A light covering of coarse litter kept on until the alternate freezings and thawings of spring are over, is the best in my judgment. While the plants should be well protected from the cold, all air should not be excluded, and stable manure, which often "burns" should rarely be used as a winter covering for plants. I think there are many rose bushes and hardy plants in the gardens of Minnesota to-day which will safely pass through the coldest Minnesota winter weather, but which will perish from a too early uncovering in the months of April and May. I believe an injudicious uncovering of plants in the spring has caused more havoc and destruction among plants than the coldest weather. When the hollyhocks are uncovered in the spring, the roots of the oldest and largest can be divided into two or more plants and transplanted elsewhere. The weeds of course should be kept out and the plants tied to stakes when two or three feet high. If a caterpillar like worm appears on them in June, as is quite frequently the case, they should be picked off by hand and destroyed. This is easily done as these worms always remain on the leaves and eat large holes through them, and are very easily seen at a single glance.

As to seeds, I observe the same rule with hollyhocks as with other flowers, namely, not to allow seed pods to form, but to cut flowers at all times freely, and to destroy seed pods when I see them forming. I buy the very best seeds obtainable, and never try to raise my own seed. There are reliable seedsmen, who make a specialty of seed raising, and it is very poor economy, in my

judgment, for any amateur to make it a rule to raise his own seeds. First of all, the virtue or strength which is taken up in the formation of a seed pod deprives the amateur of many a blossom and draws strength from the whole plant. Make it a rule to cut all flowers freely. The more generously you cut (mind I don't say pick, but *cut*) the more blossoms you will have. I never allow persons to pick flowers with the hand unless it be a few with brittle stems, which snap off short like nasturtiums or possibly pansies, but always insist on having them cut with scissors or knife. The more generously you cut your flowers, the more generously will nature reward you with an abundance of bloom. The person who does not cut and give away generously, pays the penalty himself by allowing seeds to form and thereby reducing the number of blossoms. Again, as to seeds. The science of seed raising is made a specialty by persons who thoroughly understand it and grow them under the right conditions, as our friend Toole, who gave the valuable paper this morning on pansy culture, and it is foolish for the amateur to risk the results of his next season's gardening, either as to quality or variety, on the few seeds he saves. And not only this; even if his self raised seeds do germinate, he fails to get the new varieties and the new shades and colorings which are produced from year to year, by professional seed growers. A person had better buy fresh seeds each year from a reliable source, or quit growing flowers. There may be an occasional exception to this rule, but let it be occasional. In flower growing as in other matters nowadays, let us remember that specialists are at work at all times developing, hybridizing and improving the old, and introducing the new varieties. Let us take advantage of their investigations and buy each year the best seeds and thereby get the best results in our own gardens.

President Elliot. Fellow Members, Ladies and Gentlemen: We have with us this evening one whom I know you would like to hear from, who can give us some good ideas. I have the pleasure of introducing to you Miss Maria L. Sanford of the State University.

HORTICULTURAL AND HOME.

By Prof. Maria L. Sanford.

Friends, I noticed on the program that I was advertised to give an address, I did not come out here to give an address, I did not come to give a lecture, or to make a speech; I came to tell some of our friends around here who have been interesting themselves so much to bring flowers and fruits into our homes, how glad and how thankful I am for their work. As I listened to this very interesting paper which has just been presented and pictured to myself the house surrounded by fruits and flowers, I compare that

with the ones standing bereft of these things, no rose bushes, nor hollyhocks, nor verbenas, nor pansies, nor fruits of any kind for the children. Oh, how barren it is! Then picture in your mind's eye the other; it may be just as plain a house and has cost not a dollar, but it is made beautiful and attractive by a wealth of fruits and flowers. Now this is what I came for,—just to tell these old friends and younger ones engaged in this Horticultural Society, how thankful I am for their work.

When I was a child we thought we were pretty well off for fruit. I will tell you what we had. In the garden and orchard we had currants, one gooseberry bush, one quince bush, apples, pears and pumpkins; that was the extent of it. We had in the fields, blackberries and huckleberries; and many, and many, and many a day I have walked two, three and four miles and spent the whole day in the hot sun, picking huckleberries so as to have enough. If I could tell you how fruit tasted then, if I could possibly put into words how fruit tastes to a child who is growing six inches every year, up and down and crosswise, I tell you these friends here with fruit trees to sell, would be after me to go around as an advertisement. If you could but remember as I remember, how hungry such a child is, down to his very toes, for everything in the shape of fruit, you would give your children lots of it. Now, because these things taste so good to children, they ought to have them. It makes me young again just to see children enjoy good fruit, and I want them to have enough of it, of all kinds. I want to say to the fathers and mothers here, "think about this." I will tell you, if you would pay more for fruit, you would have less to pay for drugs. If you would fill your children up with good, rich, ripe fruit, you would have less hours to spend nursing, and less complaint of pale cheeks, and weaknesses. We want to grow a hardy and a hearty race, and to do that, we must give our children plenty of good fruit.

I have just been thinking what a good thing it would be to enlist our boys and girls in this work. We remark that it does us all good to come in contact with the earth, to be cultivating something. Sometimes I hear parents complain that their boys go away from home. Now, if you fathers and mothers would interest your children in raising fruits and flowers, if you would give them early something of their own, something that they will take care of, if you would buy them some seeds, and give them a little space in the garden, you would find it would keep them from a great deal of mischief; it would make home bright for them, and make them willing to stay at home. It would be a good thing if our friends in the business could get the boys interested in their enterprise. If I were selling trees and vines, I think I should make agents of these boys and girls, give them some of my stock to cultivate, and I am pretty sure that, by and by, I should get interest on my money, over and over again. Interest the children in bringing fruit into their homes; have fruit put away in your cellar, so that, in the coldest months, and furthest from the summer time, you will have it always on your table. The Lord meant that we should be blessed

in this way. Here in Minnesota we have an abundance, if we will but use the means in our power to secure it. Let us all resolve, then, in going away from this meeting, that we will make more of our opportunities and bless ourselves and others in the abundance of the earth in this respect.

Mr. Barret. I move that a vote of thanks by this society be tendered Prof. Sanford for the interesting horticultural address she has delivered this evening and that such be put upon record.

Seconded by Mr. Wilcox and carried unanimously.

President Elliot. We have with us this evening Prof. McLain, I believe he is going to give us something in relation to bees.

Prof. McLain then gave a very interesting illustrated talk in regard to bees and their habits the following summary of which he has kindly prepared.

THE LIFE HISTORY, ANATOMICAL STRUCTURE, THE HABITS AND INSTINCTS OF THE HONEY BEE.

By Prof. N. W. McLain, St. Anthony Park, Minn.

No department in natural history presents a wider or more fruitful field for observation and research than does the department of Entomology—that branch of Zoology which treats of the history, structure and habits of insects.

Insecta far out number all the other members of the animal kingdom combined, and concerning the geographical distribution of insects it may be said that no part of the earth's surface is without them, for they have been discovered in the Arctic and Antarctic regions at the highest latitude reached and even showy butterflies of several species enliven the dreary solitudes of everlasting ice and snow.

This is clearly shown by the report of the naturalists who accompanied the expeditions of the Alert and the Discovery who found them almost up to 83 degrees north latitude.

Every department of natural history is full of interest, but the study of those species of insects that dwell in communities possesses a charm which is sure to make an enthusiast of every patient and painstaking student who observes their habits.

From its singular instincts, its active industry and the useful products resulting from its labors, the bee has from the remotest times attracted attention and interest such as has been given to no other class of insects.

The patience and ingenuity of the naturalist have found an ample field for exercise in the study of the structure, physiology and domestic economy of bees; and their increase and preservation have been the source of painstaking care and their reputed perfection of policy and government have been the theme of admira-

tion, and have bountifully supplied materials for argument and illustration to the poet and political economist of every age.

The subject of apiculture has been treated by the philosophy of Aristotle and the genius of Virgil and Shakespear. Aristotle, writing a treatise on the Generation of Bees about 350 years before Christ said with the modesty and caution characteristic of wonderful genius and the foremost scholar of his time,—“All pertaining to this subject has not yet been sufficiently ascertained; but if it ever should be, then we must place more confidence in our observations than in our reasonings. Theory, however, as far as it conforms to facts observed, is worthy of credit.”

Have we not here the inductive system of philosophy as well guarded and as clearly expressed as ever it was by Lord Bacon 1800 years afterward? In Aristotles History of Animals, we find the earliest definite discription of the honey bee. Solon in the year 600 B. C. enacted a law, requiring that bee-hives in cultivated fields, must be placed 300 feet apart.

The celebrated Cicilian apiarist, Aristomachus with 58 years of practical experience in beekeeping wrote a work on bees and honey about 500 years B. C. but his work was lost to us.

On the statute books of ancient nations, laws are found for the protection of bees, According to the old Saxon law, the theft of a swarm of bees was punished with death.

About 300 years after Aristotle, Virgil gave the current views about the habits and economy of bees, in his 4th Georgic, a poem remarkable for beauty and elegance, full of interest and full of errors.

In the first century Columella a naturalist, careful and accurate in his observations, wrote much that was valuable and suggestive and much that is simply curious. After this nearly 2000 years passed with no progress in natural history, even for 200 years after the revival of learning in the 15th century nothing worthy of note appeared.

About the middle of the 17th century Swammerdam a Dutch entomologist wrote The Natural History of Bees; a work of priceless value to natural science.

The study and practice of anatomy was then revived and substantial progress began to be made in the science of zoology and entomology.

Towards the middle of the 18th century the Swedish naturalist Linnaeus, “the brilliart Star of the North” published his “System Naturae” and threw a flood of light on the whole subject of natural history.

About the close of the last century the great Latreille of France promulgated the elective system. Since then we have had Cuvier, Leach, Zierzon, Von Berlepseh, Von Siebold and Huber and Schiementz and later C. V. Riley, and Packard, Cheshire and a host of earnest students.

A great many naturalists have written works on the honey bee, its natural history and management and the literature and text-books upon this subject are most respectable both with respect to

volume numbers and merit, and compare favorably with those of other departments in Natural Science. It is said that the bee has had more historians than the human family.

But in so complicated a branch of natural history correct observations and valuable conclusions require patient, continuous and painstaking observation and repeated experiment.

The history of the discoveries and teachings of the successive writers whose names we have mentioned proves how slow has been the growth of accurate knowledge of these insects.

What is now known is the result of the persevering labors of ages. By the study of our standard works and by means of the modern appliances for observation and experiment and instruction, the student may in a few days or even hours, learn and become proficient in what would formerly have required years of laborious and costly experiment.

This accumulation of curious and interesting and well ascertained facts, this aggregation of knowledge of the structure, habits and management of the bee, constitutes, almost a new science.

It is our purpose to give a brief but connected and simple narration of the natural history of the bee, and this description will chiefly relate to the common and best known species the *Apis Mellifica*, which on the account of its rich products is especially valuable.

The honey-bee is not a native of the New World, and when brought here was called by the Indians "the white man's fly."

Washington Irving says in *Tour of the Praries*, "The Indians consider them the harbingers of the white man, as the buffalo is of the red man and says that in proportion as the bee advances the Indian and buffalo retire."

And Longfellow in his "Song of Hiawatha" in describing the advent of the European in the New World, makes his Indian warrior say of the bee and the white clover:—

"Wheresoever they move, before them
Swarms the stinging fly, the Ahmo,
Swarms the bee, the honey maker;
Wheresoever they tread, beneath them
Springs a flower unknown among us
Springs "the White Man's Foot" in blossom.

It seems strange that bees should not have been native to the American continent, for as Irving says, "It seems to me as if these beautiful regions answer literally to the description of the land of promise, "a land flowing with milk and honey" for the rich pasturage of the praries is calculated to sustain herds of cattle as countless as the sand is upon the sea-shore, while the flowers with which they are enamelled render them a very paradise for the nectar seeking bees.

Without doubt, however, there were no bees such as are now domesticated, until they were introduced by the Caucasians.

This furnishes another illustration of the strange distribution of animal life. It is still more strange when we learn that bees of the various species are found on all the continents and islands of the eastern hemisphere.

The best known varieties of the honey-bee are the German or Black, the Italian or the Ligurian,—as they are known in England—the Syrian and the Cyprians the Carniolans the Dalmatians, and the Caucasians.

The German or Black bee is the best known variety, and the German bees like the Germanic Races have been for ages the most widely distributed.

The Ligurian or Italian bee was first mentioned and described by Aristotle.

Speaking of the three different varieties of the honey-bee well known in his time, he describes the best variety as "small and round in size and shape, and variegated in color." These bees were first described as a variety different from the German bee by Spinola in 1805. The name Ligurian comes from that of a province of Northern Italy North of the Ligurian Gulf, or gulf of Genoa.

The region is hemmed in by the Alps and here in warm and genial Italy was developed this most beautiful, valuable, and tractable race of bees, the beautiful Italians.

Dr. Dzierzon the foremost German apiarist of his time introduced the Italian bee into Germany in 1848, in 1859 Neighbor introduced the Italian bee into England and in the same year Mr. Wagner, of Philadelphia and Mr. Colvin, of Baltimore, imported some Italian bees from Dzierzons apiary.

In 1860 Mr. Parsons, of Flushing, Long Island, imported a number of colonies direct from Italy, and now, but thirty years after its first importations, this valuable variety of the honey-bee is very generally introduced throughout the U. S.

Mr. C. N. Wilson of The Rural Californian wrote me under date of December 27, 1884, that the estimated number of colonies of bees in four counties in California in 1884, was 76,000 and the average yield of honey per colony was 200 pounds, making the honey yield of California for 1884—15,200,000 pounds,—\$1,100,000.

Bees were not known in California until 1853 when they were brought by sea to San Francisco and sold high as \$300 per hive in that city.

The average price now paid in California is \$3.00 per hive, Italian Queen-bees when first brought to California in 1861, sold for \$100 in gold coin, now they sell at \$2.00.

IMPORTANCE OF APICULTURE.

As the economic importance of this industry is more generally realized, a wide-spread and growing interest is manifested in this much neglected branch of rural husbandry. The lack of practical knowledge is the main hindrance now existing in the way of the very general adoption of this pursuit among agriculturists, as nearly all parts of the United States are well adapted to profitable bee-keeping.

An idea of the present importance of this industry can be gained from the following figures, taken from the report of the statistician of the Northwestern Society of Bee-Keepers. He says: "Accord-

ing to conservative estimates we have now a total of three millions of colonies of bees which annually yield 120,000,000 pounds of honey. The value of the annual product, at an average of 15 cents per pound, would be \$18,000,000.

The estimated annual products ranges from \$15,000,000 to \$20,000,000, and the annual product of wax is about \$1,000,000 in value.

Not more than 8 or 10 per cent. of those favorably situated for the cultivation of bees are engaged in the pursuit. If even one half of those favorably situated were so engaged, the annual product would not fall below \$75,000,000 or \$80,000,000 in value.

The United States imported 2,400,000,000 pounds of sugar, at a cost of \$94,923,500, in the year 1884.

A large percentage of these imports do not bring with them a character above suspicion. Instead of being importers we should be exporters of sweets, with the balance largely in our favor. Instead of paying their money for the vile adulterations of foreign importations, our agriculturists should gather the pure and wholesome nectar annually wasted in their own fields.

The degree of skill necessary to engage successfully in the cultivation of bees and the production of honey is not greater than that required in keeping a dairy and producing good dairy products. The difference is in kind, not in degree, of skill, and one is as easily acquired as the other.

The speaker then entered upon a discussion of the physiological development, the anatomical structure, the adaptability of organs to functions, both general and special, and the habits and instinct of the honey bee. The subjects treated were fully illustrated by large anatomical charts and drawings.

Beginning with an illustration of a bee's egg, the various transformations, with the time and the conditions incident and necessary to larval growth were explained, together with the causes for variation in form, function and instinct in worker bees, drone and queen-bees, and how the entire economy of the hive is determined by the worker bees.

The structure of the ligula and the entire nectar gathering apparatus, the jaws, the antennae, the simple and compound eyes, the thorax and the articulations of the legs and wings, the structure of the legs and wings, the structure and location of the secretory and circulatory systems, the organs of circulation and digestion, the sting structure, and the adaptation of all these organs to their special uses; honey-comb building, cell filling and capping, the method and means used by bees in curing and conserving honey, the elements and sources of larval food and methods of feeding, were explained.

Nothing more than an outline of this lecture can be attempted here. Mr. McLain spoke extemporaneously for about two hours, and the large audience present were deeply interested and seemed eager to hear more about this most wonderful insect, to the study of whose life history and habits many patient scientific investigators have devoted years of painstaking labor.

The address was conversational in style, opportunity being offered for asking questions, the answering of which afforded a chance for the introduction of much that was instructive and amusing which was not down on the programme.

Near the close of the address when speaking of the wonders in the natural history of bees, which have only been discovered since they have been revealed by the microscope in its most perfected form and in the hand of the most skillful manipulators, the fact was noticed that the only royal prerogative of the queen-bee is that of determining the sex of her offspring, which she does by voluntarily adding to and or withholding the fertilizing principle from the egg, as each one passes through the oviducts, to the ovipositor, the absence or presence of the fertilizing principle in the egg being revealed only to the skillful manipulator of a modern microscope of high power.

Concerning the potential influence of this germ in determining with unerring certainty the characteristics of the new creature he said.

"Here then, within this atom whose presence is revealed to us by the microscope, are latent those subtle yet potent forces, which may have been conserved for months, perhaps for years, awaiting the time and the environment when in complete agreement with the law of its development, it should be called upon to determine, even in the minutest variation, the distinctive characteristics of a new creature. The determination of sex is a matter of choice, a royal prerogative. The limitation of sexual development; the determination of form, function and instinct—reference being had to all female larvae—is a matter of choice among the workers, the prerogative of intelligence superior to that of the queen. The queen in the ordinary and normal performance of her function, is simply reproducing ancestral features which must appear in the direct line of hereditary transmission. Every unfecundated egg must produce a male larva, and every fecundated egg must produce a female larva. And here, in these direct lines her prerogative of sexual differentiation ends.

"It is here at this stage a more subtle differentiating influence manifests itself, modifying larval adaption and determining structural features radically different and radically divergent in instinct and function. It is indeed very wonderful that the queen should have the power to voluntarily control the sex of her offspring, but the marvel consists not so much in the exercise of that function, as in the singular and unique adaptation of the delicate organs by which the function is performed. That secondary characteristics should now appear, not inherent in ancestral germs, or contributed by ancestral transmission, appears to me far more strange. That this extra differential influence, operating through intelligence or instinct—and the partition between these two appears to be very thin—and in no sense through ancestral transmission, should become persistent, is marvelous beyond satisfactory explanation. We look to the future for explanation of how the same organic being may be made to assume one of two divergent modifications of

structure, instinct and function; and how this specialization for different functions has been made persistent, and from a remote origin transmitted from one generation to another through an anomalous agency.

"Every receptive soul is filled with reverence and awe when brought into the presence of stupendous manifestations of power. I have stood upon the shore of the ocean in the mountain gorge and on the Table Rock; I have seen the rising sun reflected from the snow-capped peaks of the Rockies, and have found myself saying, "How wonderful are thy works?" and yet, I could not help adding: "However, I find everything very like what I had expected." I have looked upon the revelations of the telescope, and have followed the astronomer as he spoke with familiarity of the millions of miles measuring the inter-stellar space, and with mathematical accuracy computed the times and seasons in the great design of planetary revolutions; and I have tried to lift up my thoughts to the contemplation of "The Great Designer," whose ways are past finding out. If it be true that the mind is thus filled with admiration and reverence in the presence of the immense and imposing, what shall be the emotion of the receptive soul when the transcendent grandeur of the minute is disclosed? I have looked upon the revelations of the microscope, and the blood has stopped in its customary courses, and with blanched cheek and downcast eyes, I could but say: "Put off thy shoes from off thy feet." Verily our thoughts should be humbled and our emotions sublimated, whether we contemplate the handiwork of omnipotent power and the sway of immutable law in the creation and ordering of the eccentric solar system, or whether we recognize the presence of that same power and that same law, differentially manifested in the unfolding of insect life, and in determining the differentiating conditions, which with marvelous and delicate precision, establish and perpetuate form, function and instinct.

"From the drift of a star to the drift of a soul,
The world is all miracle under control;
The butterfly's wing and man's reverent awe,
Alike wear the chain of inscrutable law;
A law that allures us, but ever eludes,
That baffles our groping, but never deludes;
We never can hold it; it holds us secure;
And the wisest in reading shall longest endure;
A faith-bow of promise, a promise replete—
Forever fulfilling, but never complete;
We chase where it beckons, and gather the gold,
And lo, on before us, new treasures unfold!"

It was moved by Mr. Grimes that a vote of thanks be tendered Prof. McLain for his very instructive lecture.

Seconded and carried unanimously.

After some music by the young ladies an adjournment was taken until Friday morning at 9 o'clock.

FRIDAY MORNING SESSION.

JANUARY 24TH, 1890.

PROCEEDINGS OF THE MINNESOTA BEE KEEPERS' ASSOCIATION.

The meeting was called to order by President Wilcox who addressed the audience as follows:

Ladies and Gentlemen:—It gives me great pleasure to congratulate you on the interest that is manifested here in our industry, and I wish to say just this one thing in taking up the consideration of the bee-keeping interest. We have about three hours to put in our part and we must give a portion of that time to the Amber Cane Society, so I will ask of you in your remarks to be very brief and to the point, and get as much meat and as little chaff out of what you say as possible. I wish to direct this meeting towards one point, to show the importance of the industry, and the amount of value that is going to waste around us, and to show the profits connected with intelligent bee-keeping, and I shall call on you later to give, each one, in as few words as possible, a report of results. Now, if there any of you who have had poor results, and your record looks bad, do not be ashamed to state it. I will commence by reading one or two articles that have come in, to take up a few minutes' time until some more are present. I have here an article from a gentleman in Red Wing, I am not acquainted with him and never heard of him before, but as it is quite practical I will read it.

And, by the way, I think the first work should be to appoint some committees to report on society work. I will appoint as a committee to report a list of officers for the next season, Mr. Danforth, Mr. Miller and Mr. Pond. They will report by 11 o'clock. If there are any other committees, you will please suggest them. We have arranged for nearly all the work except that, I think. The work of this committee is to nominate and report a list of officers for the next season. It will save time in the election of officers.

Owing to the absence of the secretary of the Bee-Keepers, Association, Mr. Featherstone was appointed secretary pro tem.

Mr. Wilcox then read the following letter.

LETTER FROM G. W. BENHAM, RED WING, MINN.

To The Minnesota Bee Association.

I embarked in the business of apiculture last spring, 1889, with 20 colonies of black and hybrid bees. I placed them on stands very neatly arranged for that purpose. Made them watering troughs, filled them with corn cobs to give the bees' a chance to sip the water

without getting drowned, and I find this plan simple and effectual, and so long as I keep bees they shall never have to go away from home to get a drink. My bees after they had finished swarming, would in a sultry day consume 3 common pailsful of water including the evaporation, and what my neighbors' bees consumed.

On May 20th, I put sections on my hives, and some colonies went to work in them immediately, while others did not appear to have their hives filled; but they all in due time took very kindly to the supers, as I had put starters in all the sections. Everything went very quietly till June 23d. Of course that day was Sunday, and No. 4, issued a swarm! I immediately joined the stingers, caught their queen, and on their return had a new hive ready for them.

I got them in with some difficulty, but introduced the queen as soon as they got nicely started into the hive, and soon had another happy family.

My bees continued to swarm until July 18th, issuing thirty-four swarms in all; but in dividing, doubling up, etc., I only used twenty-six new hives, and did not allow a single swarm to escape. None of my hives contain less than 214 cubic inches. I use the Langstroth brood frame, and as far as my judgment goes I am well pleased with it.

Owing to a lack of knowledge and experience, I lost four colonies, they being queenless, which will not be likely to happen next year should I be counted among the bee raisers and not among the bee killers. My honey was gathered largely from white clover, Basswood, Buckwheat, and Golden rod. And when the honey flow was past my bees received from their green master the welcome applaud "well done", for they furnished me 1,400 lbs. of very beautiful comb honey. My crop is sold at from 10 cents to 15 cents per lb., according to the grade, and I now have in my cellar 42 colonies apparently in good shape with plenty of stores. To old bee-keepers I have nothing to say, as I, myself, am looking to them for light; but to the beginner, let me say:—if your bees are hard at work, do not disturb them for anything or anybody. Give them plenty of room to stow honey and they will take care of the hive. In swarming season, fill your new hives with bees if it takes two or three swarms; then tier up the supers to give them room, and you will get more honey and have stronger colonies to go into winter quarters. It is not the thing to look into hives when bees are at work, it disturbs them. It is time enough to experiment when you find a swarm that is in trouble. Give your bees a good hive, so that when they get home it is a home. Don't drive your bees into some old soap box, and stick them off in the fence corner, or some out of the way place where the sun will bake them out to-day, and the rain drown them out to-morrow, and expect them to work for nothing, board themselves, and give you a profit in the fall, for they wont do it. I would abuse myself any day before I would my bees. Give your bees a good chance, and, then if they fail, let it be in a manner their fault.

Set your hives up out of the grass, and let your bees and poultry

run together, the bees will gather the honey while the chickens will catch the millers. Also turn in some sheep to keep the grass down. Give your bees forest shade if possible; they will not swarm so much, and make more honey. Last season being my first season, my attention was drawn to some of my new swarms by their restlessness in the evening. When other bees were quiet, these would be out running to and fro over the hive. The reason of this came to me forcibly after a few weeks, when I found these hives had no queens, and the swarms were about run out. As it required some knowledge and practise to introduce strange queens into a colony of bees with safety, beginners will have better success in saving queenless colonies by taking a frame of eggs or brood from an old hive and giving it to the queenless colony, and let them rear their own queen.

In beginning to keep bees, I would say, that in all pursuits there must be a starting point, and if we never make a start we will never know whether we are adapted to the business or not. I have learned a great deal about my bees and their wants, and have a great deal more yet to learn, but because I do not know it all at once, is no reason why I should give up the pursuit. In conclusion I would humbly ask the assistance of the more proficient bee keepers of the state, that I may be successful in this most wonderful industry. And may this meeting of the Minnesota Bee Keepers which is about to convene, be a success in every way, and thereby prove itself to be of great benefit to the bee keepers of the state.

DISCUSSION.

A Member. I believe that the gentleman said you should give your bees shade; if possible, I would like a little information in regard to that. I believe there is such a thing as giving bees too much shade. From what I have observed (I am a beginner), I notice some men keep their bees so much in the shade that the hives look bad and seem to decay very quickly, and my impression is, that that is not the proper place to keep bees. I believe that they should be where they can get the morning sun.

President Wilcox. Make them comfortable.

A Member. What do you say about the shade?

President Wilcox. A certain amount of shade in this climate is very desirable. The position you report is my favorite position. I keep them under some large trees at my place where they are partially shaded. The idea is to put them in as comfortable a position as possible.

Mr. Pond. Mr. President, I don't consider that shade is absolutely necessary. My brother has his bees on a piece of land that has no trees on it and it is a southern slope. He has had 73 colonies of bees and he averaged about 175 pounds of honey to the colony, and there was hardly a hive of bees in the shade, and all

faced the south ; but he aims to give them plenty of room so that the hive is not absolutely crowded in the hot weather.

Mr. Allen. I don't think our friend approves of a dead shade. I am acquainted with the gentleman, and I know where he keeps his bees. I don't think he approves of having a dead shade, and so far as my observation is concerned, I don't think it is necessary a partial shade would be my idea.

President Wilcox. I will next have read a paper pertaining more to honey making than bee culture: It expresses some views I heartily agree with. Allow me to introduce Mr. Thielman said to be the "bee king of the state."

Mr. Thielman then read a paper on the production of comb honey.

PRODUCTION OF COMB HONEY.

By C. Thielman.

LADIES AND GENTLEMEN:—I am requested to read a paper on production of comb honey to this assembly. I will try and give a few of the points which came under my observation and study, viz; my 20 years of beekeeping, and which have proved with me practicable and profitable, and in which I have been very successful.

The first condition for successful beekeeping is, a good locality with plenty of clover, linden and other forest trees and shrubbery. As a rule the clovers and linden furnish the bulk of the honey crop in the northern part of the U. S. though sometimes they fail to yield honey, when as a rule other sources give us a honey crop, such as corn, mint, tame and wild buckwheat, asters, golden rod and other fall flowers, and one year I even got a nice honey crop from the birch trees, without them being in bloom. The honey could be seen in drops at the junctions of the leaves and the newly growing twigs. This was very fine honey no honey due. This proves that nature furnishes honey sometimes in the absence of flowers. The next essential is strong colonies of worker bees; without them we cannot obtain the best results and in order to have the bees in the right time, we must skillfully and judiciously manage our spring's work. After successful wintering we must try to keep our colonies warm. This will assist in brood rearing. Many colonies have succumbed to this neglect. I find good honey the most valuable for brood rearing. If honey can be had, sugar should not be fed. Much could be said on this subject, but I will abstain from it here. From my experiments and what I have seen among other beekeepers, I have concluded that the Langstroth (or similar in principle) hives are the most desirable for comb honey production. They are simple and easily managed and are well adapted for the surplus arrangements, though most any ex-

perienced beekeeper may manage to obtain good results with other and less practicable hives, as it is not the hive that makes the honey. The surplus arrangements should be made so as to keep the sections clean and square while in operation by the bees. I have experimented with many different kinds such as the wide frames, the T supers, the Heddon case and others. The wide frames are too much bother to handle, the T supers have left the sections the best of any I have used. The Heddon case comes near to the best (generally speaking) and on this principle I (7 or 8 years ago) constructed a case which has the desired features (not patented). This case keeps the sections clean and square, is light and easily emptied, it has a two inch wide glass strip on each side, with wooden slides over them. With these little windows I can see the advancement of the sections (when time for tiering up, or taking them off) in a moment at any time, without disturbing the bees in the least. This arrangement is the most valuable and the most convenient one, for comb honey production of any I have ever seen or read about. With all other supers we have to disturb the bees more or less to find out the true condition and advancement of the sections, which disturbing means a loss of honey, or many dollars and cents during the honey season; for, when bees are disturbed while busily at work they cease it for some time, neither will they finish the sections as nicely if bothered every little while. All unnecessary disturbances should be carefully avoided.

If the capacity of the brood chamber is right, then contracting is not advisable, nor is reversing; neither is it to any advantage to change frames, brood, bees or do any other such tinkering. Provided the colonies are in a normal condition, the less such colonies are disturbed the better will be the results. Separators are not needed and are a hindrance to the bees and more work and expense to the keeper, but instead of separators we must stand the hives level from side to side and have the hives plumb full of worker bees, if this is done I assure you that you will not want any separators to get nice section honey. Small or weak colonies cannot profitably be worked for comb honey; but considerable extracted honey may be obtained from such or they may be united. The nearer the section cases can be in connection with the brood nest, the quicker the bees will enter and work in the sections. Mine are only a bee space apart. Queen and brood are the "highly affectionate elements" for the worker bees and are thereby greatly encouraged for the storage of honey, but bees without queen or brood are discouraged and are no good for honey production. It seems ridiculous to see it claimed by some writers that they get better results by taking away the queen.

Queen excluding honeyboards are a necessary evil and a hindrance, though I have had but little brood in the sections without them, except occasionally when two or three swarms go together, and when I hive them into one hive. At such times queen excluding honeyboards for a number of days are in their proper place, but at any other time they do more harm than good for comb honey production. Climate and location may make some difference.

My section cases fit the tops of my hives, or brood nests, and hold four rows, or $28 \frac{1}{4} \times 4 \frac{1}{4} \times 7$ to the foot sections with three partitions between the rows and a bee space on top. The sections are filled with nearly full sized sheets of extra thin Dadant foundation, the sections with comb from the previous season are used up first, and are generally filled with white honey, which sells as well as that which has foundation. The above sized sections should generally be adopted as they sell the best.

Bees are more easily managed through the middle of the day, especially on warm, sunny, calm days, and when honey comes in freely. On raw, windy days bees should be let alone. Early in the morning or late in the evening bees are cross. I find no advantage in shifting partly filled sections from one case to another, in order to get them finished or completed, neither is it to any advantage (for fine quality and flavor) to take off the sections as quickly as finished or capped. Honey thus taken off has not its full ripeness and value, even if it looks nicer; the more I study this point the more I find its correctness.

All surplus receptacles should be taken off the hives as soon as the honey season is over, and all unfinished sections should be deeply shaved off and extracted, cleaned out thoroughly by the bees, cleanly and safely stored away for next season's use.

As a general rule my bees are in a fine condition for winter when the honey season is over. They have their stores in just the position their instinct directs them to for safe wintering, because they are not continually interrupted by turning them upside down and otherwise molested. There is one more point which should not be overlooked by any comb honey producer, not that he can only produce a salable article, but that it should be also the best of its kind in quality. In order to obtain the highest point in taste, quality and keeping, we must evaporate all the moisture we can out of it. After taking from the hives it should be put in a room in which the air is pure, and with a temperature from 75° to 85° above zero for four or five weeks. This gives it the finishing touch and without this operation honey has not its keeping quality. Much more honey would be consumed on account of its finer flavor if this were generally practiced.

Much more could be said on the production of comb honey of less importance but my essay is too long already.

President Wilcox then read his address :

ANNUAL ADDRESS.

By President Wilcox of Hastings.

Ladies and Gentlemen of the Bee Keepers' Association.

It gives me sincere pleasure to meet with you again and to be able to congratulate you. We may truly look with thankful hearts to Him who guides our way, for the prosperity and

success which has blessed our efforts. We assemble here under pleasant auspices and it is my hope that our deliberations may prove so instructive and profitable to you all that you will each one of you feel, as you return to your daily duties, that you have been amply repaid for the time and expense of attending this meeting and that you have done your duty by contributing your mite in spreading a knowledge of our industry among those who know it not, where, like a kind word to the afflicted, or a messenger from Heaven, it may bring encouragement to our farmers, comfort and happiness to their homes, and prosperity to the state.

We meet for the attainment and promotion of knowledge we should radiate as well as absorb and strive to instruct those who know less than ourselves, while we learn from those who know more, and so become benefactors to the community, while we strengthen and improve ourselves. The contact of mind with mind in social intercourse; descriptions of our experiments our failures and successes; the details of our work; facts learned by observation and experience gained in the practical everyday work of the apiary as well as ideas gleaned from careful painstaking study and search, and clothed in the simplest language of our daily lives, are of the greatest value in contributing to knowledge of the possibilities within our reach "*when by the aid of science we secure the stores by nature given.*"

Bear with me for a moment if I glance at the magnificent resources of our adopted state—well named "Star of the North"—from Iowa to the Lake of the Woods, from the Dakotas to the Mississippi and the "Zenith City of the unsalted seas," 83,000 square miles. Forest and prairies with splendid vegetation and luxuriant flower and every acre of its fertile soil exuberant with nectar and even the leaves exuding honey from every puncture.

We look with pardonable pride at her wonderful grain fields. We are lost in admiration as we are told of her 35,000,000 bushels of wheat, of her 60,000,000 bushels of oats, of her 30,000,000 bushels of corn, of her millions of rye and barley and buckwheat. We listen with eager attention hours, days, and weeks to our able Institute lecturers and stand with open-mouthed astonishment as they tell us how to *milk the cows, make the butter and feed the hogs*, and worry our vexed heads in contriving how we may squeeze another dollar out of the old farm; yet not one in a thousand of the farmers of Minnesota ever thought of the fact that more cash value of honey was permitted to go to waste every summer than the whole aggregate cash value of the wheat, rye and oats.

It is the estimate of careful men that such a state as ours will yield an average annual product of 10,000 lbs. of honey per square mile. This would give 830,000,000 lbs., or 100,000,000 dollars' worth for the state. Is this crop worth saving? If it is, we should recommend such practical measures as will help others to benefit themselves by saving this product of nature which is placed within their reach. If he is a benefactor who makes two blades of grass grow where one grew before, what is he who enables the rural population to utilize and save from loss that substance that would

make our land like the typical land of plenty?—flowing with milk and honey.

What would we think of the business sagacity of a man, if he had hundreds of acres of finest wheat at his door, and let it waste for want of harvesting? Yet our fields are burdened with millions of dollars worth of the finest and best sweets in the laboratory of nature, and we lose it for want of harvesters, and send to Cuba and import \$2,000,000 worth of sugar for our tables.

God has placed within our reach an abundance of harvesters to gather the nectar of the flower and the manna of the forests; and while they are foreigners—mostly Germans and Italians—they are imbued with no anarchist-sentiments and are famed for their industry and intelligence, as well as their willingness to labor wherever there is work to do, early and late, for their board, which is usually about one tenth of the crop they gather.

With these skilled artisans at your command, it is for you to study their characteristics, and instruct the people in this management, show how to derive the greatest profit from their labors, and by increasing and cheapening the production of honey help to subserve the public good and solve the problem of a successful agricultural system by adding another means to those already employed in securing comfort and contentment, happiness and prosperity, among our rural classes. What tenth that carries blessings and benefits to others, should be doubly dear to our own hearts and as we grapple with the common foe—ignorance—we should strive to make the road to success so plain, that the blind might see, and the most obtuse understand it.

In a state like ours, distinguished for abundant natural vegetation and diversified culture, it is almost impossible to overstock any locality particularly after the importance of intelligent management and necessary conditions for profit are understood and appreciated. Minnesota could sustain 10,000,000 colonies just as well as the 150,000 she now has. In Russia and Hungary 4,000 or 5,000 colonies in a single apiary are not uncommon. According to statistics there were 600,000 colonies in the province of Lunenburg or 141 to the square mile, and a German writer says the importance attached to bee culture accounts for the fact that the people of this district (so barren that it has been called the Arabia of Germany) are almost without an exception in easy circumstances.

In Corsica the product of honey has averaged 1000 lbs. per square mile annually for many years, and the island of Cyprus far exceeds this amount.

In some provinces of Greece the number of colonies will average 500 and the product of honey 15,000 lbs. per mile and in Friesland 1,200 square miles sustains 2,400,000 colonies or 2,000 each. Compare this with the less than two colonies per square mile here. Unlike our friends of the Horticultural Society who struggle valiantly against the obstacles imposed by adverse circumstances and have overcome with skill and perseverance the climatic conditions nature has supplied, we have but to reach out and grasp the treas-

ures so lavishly spread before us and profit by the most favorable condition, for the pecuniary success of our industry.

In New England and the east and most parts of Europe an annual average product of 20 or 30 lbs per colony is obtained while in California, the lauded paradise of beekeepers, 50 to 60 lbs is considered a good average. But here in "cold Minnesota" the beekeeper that does not average 100 lbs or more of surplus per colony is behind the times and fails to take advantage of the circumstances surrounding him. And I believe it is perfectly practicable to produce the finest grades of honey ready for the markets of the world at 5c per lb or less and I look forward to the day when it will be deemed a necessity instead of a luxury upon every table in our land. In considering the spread and development of apiculture we should lay aside all selfish motives and look only to the public good, and inculcate such lessons as will aid the beginner as well as those in a more hopeless condition who have adhered to the practices of their fathers and have not heard the tramp of those who are leaving them behind in the onward march of progress.

THE BEE-KEEPERS' ASSOCIATION.

When called to act as president of this society, a little more than one year ago, I had no adequate idea of the labor it would involve the pleasant acquaintances it would make, or the opportunities for disseminating a knowledge of improved methods it would bring. With no money in the treasury, and no appropriation from the state, we have proceeded on in the even tenor of our way, until we meet to-day with 40 more members than we had one year ago, and the solid support of the bee-keepers of the state behind us. And before another year, by wise counsels and persistent effort, I expect to see our membership surpass any similar organization in the United States. No class of men are more intelligent and better appreciate the advantages of an association, and but two men whom I have asked, have refused to cast their lot with us. So we have reason to believe that from the 700 bee-keepers in the state, at least 500 will, with proper solicitation, unite with us.

Several questions of public policy demand your attention at this time; one of which is the advisability of an effort to secure proper recognition in the agricultural instruction and experimental work being done for the benefit of our state. No branch of practical agriculture taught in connection with the University adds one half to the wealth producing resources of our state as would be done by proper instruction in the practical application of science and improved processes to its agricultural interests. More than one half of the farmers who keep bees use the old box hives and kill them off in the fall to get honey or let them die in winter from ignorance; and no one has tried to teach them better. So others seeing their loss hesitate to engage in the pursuit. What farmer could raise wheat at 50c a bushel, or oats at 15c, except by the use of the best improved machinery? Yet the methods employed in agriculture 30 years ago and followed by many of our farmers to-day are as much out of date and behind the practices of our most skillful

specialists, as the sickle and the threshing floor of the ancient Egyptians are behind the harvesters and steam threshers of today.

I have conferred with some of the regents of the University and am satisfied they will do all in their power to broaden the scope of its usefulness by extending every branch of agricultural knowledge that will promote the prosperity of the masses and the welfare of the state.

THE FAIR.

In the spring of 1889 I had the honor to appear as your representative before the committee of the State Agricultural Society charged with revising the premium list; and by calling attention to the importance of our industry secured a respectable appropriation for our department which enabled us to make the largest and best display of bees' honey and aparian supplies ever seen in the Northwest. About two tons of honey was furnished and nearly half put on exhibition, while the balance remained unpacked for want of adequate room and facilities for its display. I would recommend that steps be taken to build a pavilion for our own use if we can make satisfactory arrangements with the Agricultural Society to that effect.

One feature we should aim to develop in all future exhibitions is the public handling and manipulation of bees. Disappointed in securing the man I expected for this purpose by his sickness I was obliged to take his place and was surprised to see the interest excited by a few of the simplest operations in the everyday work of the apiary.

With knowledge gained by experience, we could make another exhibition far more interesting and instructive to all; yet it is gratifying to know that our first effort in that direction received commendation from all quarters and proved a credit to the Association.

Our status in connection with the Horticultural Society, should receive your consideration, for I am well aware of the fact that some of our members do not approve of my endeavors to cultivate the closest relations of friendship with this older organization. Yet I believe all such kindred associations should work together for the common good, and think it best that we should act as an auxiliary of that society and strengthen its hands in seeking additional aid from the legislature, rather than to enter as a competitor for legislative favors which might result disastrously to both.

You have a mission work to do, a sacred duty to perform, a labor which should be a labor of love, to combat the ignorance of the day with the light of truth. Facts are the strongest arguments in all cases. The problem of successful wintering is solved. There is no more danger of loss in wintering fifty swarms of bees than as many cows. The problem of successful handling and manipulation is solved. With proper management they are as harmless as so many flies and much more easily controlled.

But you, need no encouragement. It is the farmers who live upon our prairies and in the great woods, who neglect to secure the treasures of nature that surround them, that need our sym-

pathy. And to those struggling beneath the blighting powers of monopolies selling their beef at 2c. a lb. and their wheat for 50c. a bu., while it takes a bushel of oats to buy a pound of honey, or two of sugar, the strongest reason that can be given for keeping bees is not the pleasure of their company, or the invigorating charm of their presence, but the simple fact that they make more clear profit than any kind of stock ever kept on a farm, or any crop ever produced from its fertile soil; and the ratio of their profit will be in proportion to the care and skill bestowed in their management.

Let me impress one thought more upon your minds. Always keep fully abreast of the times in your business. There is always room at the top, or in front; and he who falls behind will surely get left by the wayside. Get the best appliances, employ the best methods, use the best devices, hold fast to all that is good; and the increased value of your products will pay ten fold for the labor and expense incurred.

DISCUSSION.

Mr. Latham. I would like to know how the loss is in winter.

Mr. Wilcox. As we have no more papers, perhaps it would be just as well to take up the answering of questions. I will say in response to Mr. Latham that our time is so limited that I have deemed it impossible to touch upon the technical description of what is necessary, but I will venture to say this, for the dozens of bee keepers, that are farthest advanced and up to the times, that for the last two or three years and even longer, there have been no losses to amount to anything. That has been the great difficulty in the way, people have not understood the proper conditions for putting them into winter quarters, or have allowed them to remain in such a condition that they meet with heavy losses during the winter; but for those who put them in proper condition there is no danger of loss whatever. Our loss is nothing; it will not amount to five per cent, and I doubt whether it will amount to three per cent on an average.

Dr. Friselle. You say, if they are put in proper condition. Will you state what the proper winter conditions are.

Mr. Wilcox. Doctor, I should be very happy to, but there are very many little things in connection with their condition that are of great importance.

Dr. Friselle. In a general way?

Mr. Wilcox. I will say in a general way to give them proper ventilation and put them in a house, or cellar where an even temperature can be kept. I have in my own cellar 40 swarms now, that are just as dormant as when they were put in there. That is the proper condition to have them in, and in that way they will lie

through the cold weather of the winter until they commence breed-
in the spring.

A lady member. At what temperature should the the cellar be kept.

Mr. Wilcox. In a dry climate or a dry cellar the temperature may be kept at 40° or a little below. As it gets moister it should be kept a little warmer. The variation of a few degrees will not make much difference if the other things are all right.

Mr. Sampson, I wish to draw out a thought which I think of value to parties thinking of undertaking to keep bees. It is in regard to persons attacked by bees. Now, the remark was made last night that when a bee stings a person, it created an odor which caused other bees to spring towards the person stung. This draws out the fact that bees are very sensitive to smell, and some people give forth more odor from the body, and are more liable to be stung than others. I would like a thought upon that from the President.

President Wilcox. These small matters have all a certain bearing and influence. It used to be thought that odors had a powerful effect. I may say that if a man does get stung he wants to call to his aid all the nerve power he has and not flinch a bit. There are many facts of importance in connection with those things, that nothing would give me me more pleasure than to take up the subject where Prof McLean left it in his very interesting lecture last evening and give an hour or two in following the same line of thought. But we cannot do it because we have not the time.

I think, judging from my own locality, that a neighborhood cannot be overstocked with hives unless it produces ten or fifteen thousand pounds of honey to the square mile. There are hundreds of swarms that do not gather one-tenth part of the honey that goes to waste in the honey season.

Mr. Gaylord. I want to ask you what you think the shrinkage on an average should be.

Mr. Wilcox. Well, while they are lying dormant in the cellar, under proper conditions, they ought to use from five to ten pounds, ordinarily, of honey. I don't think under the best conditions they will use over five. The time that they run short of honey is after they are put out and commence to fret, then they must have a supply of honey and pollen. If you don't you will see them killing off the brood and the young bees will suffer.

Mr. Cutler. We have out on the prairie a bee-keeper who has been in the business probably over 20 years. He has kept bees ever since I went out there and that was 20 years ago. He claims

that nine pounds is sufficient to winter them on and he will warrant them to go through all right on that. He commenced last spring with about 80 swarms of bees, and he showed me about 15 hives that he intended to use to put the surplus bees in that he got this last season. This man has made a great amount of money. At one time he lost every bee he had, but he was not discouraged. He went to work and got some more and he is very successful in bee-keeping now. He keeps down the increase and keeps his swarms very strong. He put in 81 swarms the last fall and in the spring he had 79 left, and those two were lost on account of being queenless. That is an important point. The old bee-keepers say that we must see that our colonies have strong, fertile queens, and be careful not to keep a queen more than three years, and it is better to renew them at the end of two years.

I wish to say one word in regard to the uses of honey. Now, you know that there is a disease called la grippe that is going all through the country. There are thousands sick with it at the present time. The editor of the American Bee Journal has been confined to his bed with this disease and there was one of his neighbors who was very low with it. They called in three doctors, for consultation, and they decided they would try honey and lemons and if that wouldn't help her, they didn't know what to do. They commenced using the honey and lemons and at the date of the last Beekeeper's Journal she was getting much better. I have a brother living here in this town, and he had a very severe attack of this disease which settled in his jaw. I brought down some honey with me and he commenced to use it with the lemons and last night he was fully 50 per cent better. He said he commenced to feel better right after he used it.

President Wilcox. I wish the bee-keepers here to state how many swarms they have on an average, and how much honey they have produced and just about what the bees have netted them.

Mr. Thielman. I commenced with 185 colonies last spring. This is the basis we go on as a rule. They have increased to two hundred and have produced twenty-five thousand pounds of honey which netted me \$2000 or about that. There were twenty-two thousand pounds of comb honey and three thousand of the other.

Mr. Pond. Last spring I commenced with about five colonies of bees, and increased to about seventeen. I had six thousand pounds of extract honey, or within a few pounds of that. Almost the entire work of attending to the bees was done by my daughter 19 years old, and my son about 13 years old. My brother makes it his entire business to attend to bees. He started last year with seven-

ty-five hives and extracted about thirteen thousand pounds of honey. He increased to one hundred and twenty but has reduced them back to about eighty, as that is about the number he wishes to keep to attend to in the spring.

A member. How did he reduce them?

Mr. Pond. By doubling them up. He killed what he considered his poorest.

A member. Did he find ready sales for his extracted honey?

Mr. Pond. It creates a market. He sells a large quantity to grocery stores in jelly jars. Persons in St. Paul and Minneapolis get samples put up in jelly glasses, they see who it is from and it creates a demand for more.

Mr. Danforth. We started last spring with about 53 swarms. I am not at home to take care of them, so my wife has care of the bees. I sold down as low as I could and got down to 35 colonies. Our comb honey averaged about 115 lbs., and our extracted honey about 180 pounds to the colony, and we kept down our increase to 15 or 16 colonies. There are now, I believe, 40 swarms.

Mr. Knowles. I have had very little experience in bee-keeping in the modern style until recently. When I commenced in this country, I had one swarm. I wintered three a year ago this winter. I got but little honey, because I was not accustomed to them. Last spring I started with three swarms; I have eleven now, and have about 300 pounds of box honey. This is my first experience.

A member. I have not heard anything said about the bee moth.

President Wilcox. I suppose that is because the bee man of to-day doesn't care or know much about them.

Prof. McLean. In regard to moths. Oh well, we have so many other things to talk about—the question of bee moth—well, we don't like to talk about that at all now. Bee moth means negligence, laziness and all those unpleasant things that we don't like to think of.

Mr. Pearce. Does it not mean a hive without a queen generally?

Prof. McLean. Oh yes, there is where it comes in. Anything that demoralizes the condition of the hive; that means you can get a colony out of its normal condition; if they have lost their queen it means robbing bees; they don't protect their hives so that they do not defend their hives properly from the moth oftentimes.

Mr. Wilcox. Here is a resolution that has been handed in for our consideration.

Resolved. That we memorialize the regents of the University to give to the apicultural interest of the state such recognition as

its growing importance demands in the educational and experimental work under their control, and teach by practical instruction the best manner of management and handling thereof.

The adoption of the resolution was moved by Mr. Thielman and was carried.

The committee appointed to report upon a list of officers made their report and the following list of officers were elected :

LIST OF OFFICERS FOR 1890.

President—L. H. Wilcox, Hastings.

Vice-Presidents — Wm. Danforth, Red Wing ; E. R. Pond, Bloomington ; Wm. Weis, Minneapolis.

Secretary—C. Thielman, Thielmanton.

Treasurer—J. G. Bass, Hamline.

Executive Committee—M. Cutler, Sumpter ; C. F. Miller, Faribault ; H. V. Poor, Bird Island ; L. E. Day, Castle Rock ; J. S. Featherstone, Nininger ; J. W. Murray, Excelsior ; P. F. Bradford, Empire.

Prof. McLain offered the following motion : That a committee of three, of whom the president shall be chairman, be appointed for the purpose of taking such action as in their judgment seems best, to secure an exhibit at the forthcoming state fair, and proper recognition in the way of premiums.

Seconded and adopted.

The committee was appointed as follows :

President Wilcox, chairman ; Wm. Urie and J. S. Featherstone.

PAPER ON HONEY.

By J. W. Murray, Excelsior.

Cui Bono? Says the Spaniard in response to a dubious proposition.

When requested to furnish this paper my first mental response was, Cui Bono? what good? What's the use of essaying to offer such a paper?

Every intelligent apiarist knows that I cannot attempt to teach our art to the uninformed in any such a paper, for it requires years of reading, study and manipulation to acquire it. And every intelligent apiarist knows full well that he need not expect me to offer a contribution that will be very instructive to him.

Then Cui Bono? My mind has not yet offered any satisfactory response to its own question.

The only thing that occurs to me as worth attempting is simply to give some of the results of my own experience and observation and perhaps suggest some points for discussion, all of which is to be taken only for just what it is worth.

My apiarian experience extends over a quarter of a century, and after several years of hive testing tribulation at the outset, I finally settled down to a hive taking a frame about 9 by 15 inches, inside measure. This proves quite satisfactory.

My hive is a light, modified and simplified Langstroth. It has no portico, has a loose floor, and a thin honey board about $\frac{3}{8}$ of an inch thick which I have no notion of abandoning. I use a flat cover which answers for hive, honey cap, or super, fitting all alike. For my extracting supers I use the perforated zinc honey board, and regard it as simply indispensable. The frames fit either the brood chamber or the extracting supers. The frames are put together with Root's metallic corners, so changed as to permit the ends of the top bar to rest upon the metallic rabbits, and the ends are bevelled on the upper side to an angle of about 45 or 50 degrees. This secures every advantage and avoids every disadvantage of the metallic corners, and makes the nicest frame I have ever seen.

For an apiary of not more than 40 hives I much prefer to place the hives in a line east and west, fronting south, and three feet apart. I shade my hives only during the hottest part of the summer, and the only shade cover I use is a tight shade board about two by three feet in size. It is made of $\frac{1}{2}$ inch pine, nailed upon four 1 by 2 inch cleats, which raise it two inches above the flat cover of the hive. In very hot weather a continuous line of shade may be secured by laying a shade board from the first to the second and thus on throughout the line.

For wintering a warm, dry, dark and quiet cellar is much the best for a small number of colonies. I place a frame two inches high, with movable wire cloth front piece, under each hive. I find this very useful. Any upward ventilation of the hive is worse than useless.

Water is not required by the bees during the first half of the winter, but is needed during the latter part of the winter.

I keep only the common bees. Italians sting unendurably; swarm ungovernably; dwindle fearfully; winter poorly, and are inferior comb honey producers. They are good at cramming with honey the brood chamber, where no one wants it; are more quiet upon their combs in gentle handling, and they are much superior to the black bees in guarding their hives against robber bees.

This latter is the only point upon which I regard them as superior to the black bees.

Any location possessing forests, and large and small fruits, linden, white clover, sumac, and golden rod, is a good honey location.

I should not know how to keep bees without linden or white

clover. It will not pay to sow anything for honey alone, unless upon land of but little value. It is also useless to plant in small quantities. Plant by the acre or not at all.

The farmer cannot have a crop of wheat and a crop of corn from his field at the same time, but he may elect to have a part crop of each. Neither can the apiarist have a large crop of swarms, and a large crop of honey from his apiary at the same time. He must choose one or the other; or he may choose a part of each.

I run my apiary for honey, and not for bees, as a rule, and therefore I usually have but a small increase of colonies; and if the season is a good one, I usually obtain a fairly good yield of honey. I regard 50 lbs. comb honey as a good yield for a strong colony in a favorable season. The last two years have been unusually good honey years. Year before last I secured an average of 120 lbs. extracted honey from each colony; and last year an average of 70 lbs. box honey from one-sixth of my apiary, and an average of 150 lbs. extracted honey from the balance. The latter was, however, the largest yield I have ever obtained.

For several years I have not clipped any queens, and I rather prefer them unclipped; but would clip if surrounded by large trees. I permit natural swarming, so far as I permit any, and then manage queens, swarms, cells, and hives, to suit myself. If a swarm is out, and I fear that another swarm may immediately issue, I have discovered that I can easily and certainly prevent its issuing for the present, by simply covering the hive with a carpet or blankets, excluding the light, and making it night for them. But this must not be done if they have at all started to swarm. I have found this a valuable discovery. Swarms can easily be kept from uniting, (unless the swarming colonies are near each other,) or from absconding, and can be driven in any direction, or speedily settled almost anywhere, simply by the aid of a pail of water and a dipper. No swarms need be lost.

A small amount of drone comb must be allowed in the brood chamber, or you will have drone brood in your supers, or sections, for the little fellows imagine "they can't keep house," without drones. Tin separators are not necessary to secure straight combs, unless for glassing.

In handling bees, I use the Bingham smoker, and usually but little smoke. For smoker fuel I use dry, decayed maple or linden, and find nothing else so good. I never use tobacco smoke about my bees or honey. It is very disagreeable and irritating to the bees, making them cross and irritable. Tobacco smoke is disgusting, sickening, and very poisonous, and I have no doubt that sickness attributed to honey is often caused by eating honey smoked and poisoned by the sickening and poisonous tobacco smoke. I wish most heartily that all dealers in honey would absolutely refuse to purchase a single pound of tobacco smoked honey. Bees that cannot be managed without tobacco smoke, had better be brimstoned.

The Northwest has had a large crop of fine honey the past season, and our local markets are glutted, and honey goes begging for buyers, at unprecedentedly low prices.

In most of the states south and southwest of us, and in California, the crop seems to be a light one; and in the states east of the Ohio, unusually light, owing to the extremely wet season they have had, while we were having an extremely dry season in the Northwest.

I have been requested to say something about the encouraging, and the discouraging features of my business.

As briefly as I can I answer. The most discouraging features I have had to contend with have been winter losses, overstocked markets, low prices, and difficulty of selling.

Three times I have lost my whole apiary in wintering, to which have to be added many smaller, but not inconsiderable winter losses, and losses from spring dwindling which is only another name for winter losses.

I have followed my first impulse in naming winter losses as my greatest source of discouragement, but my second thought challenges the correctness of my first, and I am not at all sure but the overstocking of our markets by California, and our neighboring states, with consequent low prices and difficulty of selling, is much the more discouraging feature of the two.

The more encouraging features are that I find here a good honey region, and I think the honey crop is as reliable as the wheat crop. I also discovered that by careful management, I seldom fail to obtain quite a satisfactory yield of honey in proportion to the number of colonies kept.

But I am making this paper too long, although I have tried to condense to the greatest possible extent, and I must bring it to a close and submit it to your judgment in all its crudity and imperfection, painfully conscious that all theories, plans and *modus operandi* are to be tested by their success or failure; for failures sadly discount the finest theories, while success alone can vindicate their adoption.

A letter about the sorghum industry, from Hon. Seth H. Kenney, was then read by Mr. Miller.

LETTER FROM HON. SETH H. KENNEY,

OF MORRISTOWN, MINN.

To the Secretary of the Minnesota State Horticultural Society.

DEAR SIR: Replying to your request to forward a statement regarding the amber cane industry for 1889, I report that we have grown the finest cane of any latitude in the United States, the past season; and the manufactured product is much sought after for its purity and fine flavor. This, I believe, is largely due to our pure air and healthful climate. I find the principle obstacle in Iowa, Dakota, Wisconsin and Minnesota, has been the short seasons for manufacturing, before heavy frosts. I have seen the products from a great many factories, the past season, and our manufactured products are much superior to theirs.

I have a new variety of amber cane that I originated from the Minnesota early amber cane, that will add as least two weeks to the working season besides ripening the cane, so that it will be twice as valuable for sugar and will each year give from thirty to forty bushels of ripe seed per acre. This for feeding purposes is nearly as valuable as Indian corn. The history of this seed is this; two years ago I found at harvest time, two kinds of cane seed that had ripened early and the cane was rich in saccharine matter. I sent a few of the seeds to Peter Collier formerly government chemist. He gave the new cane a test the past season, and he thinks it the most valuable and one of the earliest kind they have. I have no seed for sale or for distribution of this variety at present. The early amber syrup and sugar has been pronounced the best in years past and this variety stood the highest test of any thing at New Orleans for quality. Last spring I was requested to prepare an exhibit for the Paris exposition, by Hon. Norman J. Coleman, commissioner of agriculture. The syrup was sent in sealed tin cans; the sugar in boxes. I have received notice from the Director General of the exposition that this exhibit from Minnesota had been awarded a premium. This is the second time the cane products of Minnesota have taken premiums and I am of the opinion that our amber cane products will soon be recognized as superior to any on the market. This last season we commenced to plant the early amber May 9th, but late frosts and cold weather interfered so much with the work of planting that we did not finish until May 22d, but the last planting matured as early as the first.

The following is the cost of growing my crop of cane in 1889:

Plowing 44 acres.....	\$44.00
Marking and planting.....	33.00
Hoeing and thinning.....	44.00
First plowing.....	26.00
Second plowing.....	20.00
Third plowing and seed for planting.....	28.00

Total cost of growing 44 acres.....\$195.00

or \$4.45 per acre, without reckoning anything for use of land. We began cutting cane the 16th of September. I shocked several acres, putting 144 hills in a shock and cut the rest and laid it down in small piles.

The drouth lessened the yield of juice but the quality was of the best. It yielded of syrup 100 gallons to the acre. I worked the cane crop for about 100 farmers.

My entire product was 10,400 gal. It took 25 days of 13½ hours to manufacture this amount at a cost of 7 cts. per gallon on an average of 416½ gallons per day or ½ gallon per minute for the entire 25 days.

If the cane had been well refined and of the usual saccharine strength the product would have been doubled. The amount of wood used was thirty cords.

The average price per gallon has been 45 cts at wholesale and the demand good. I have forwarded a barrel of Minnesota early amber

cane seed to Canada to be distributed among the farmers for planting next spring.

With better varieties there will be more marked results.

Already the results obtained have added much to the wealth of the United States.

SETH H. KENNEY.

P. S. As most of the officers of the state amber cane association are, and have been members for many years of the Minnesota State Horticultural Society, and as our worthy secretary of the amber cane association has moved away from the state, and as the members of the Horticultural society have been from the first largely interested in the amber cane industry, I would as one of the executive committee of the amber cane association recommend turning over the funds now held by the amber cane association to the State Horticultural Society to use as they see fit. S. H. K.

FRIDAY AFTERNOON SESSION.

JANUARY 24TH, 1890.

The meeting was called to order by President Elliot. The committee on award of premiums made their report, which was on motion adopted as follows :

AWARD OF PREMIUMS.

Your committee on award of premiums presents the following:

APPLES.

	Prem.	Amt.
Best collection Minnesota apples, S. Corp, Hammond.....	First	\$5.00
Best collection Minnesota apples, Wm. Duffus, Lake City.....	Second	3.00
Best collection Minnesota apples, J. S. Harris, La Crescent.....	Third	2.00
Best display of Wealthy apples, E. Wilcox, La Crosse, Wis.....	First	3.00
Best display of Wealthy apples, Sydney Corp, Hammond.....	Second	2.00
Best display of Wealthy apples, Wm. Duffus, Lake City.....	Third	1.00
Best plate Winter apples, E. Wilcox, La Crosse, Wis.....	First	2.00
Best plate Winter apples, J. S. Harris, La Crescent.....	Second	1.00

PLANTS AND FLOWERS.

Best display flowering ornamental plants, F. G. Gould, Excelsior..	First	5.00
Best display roses in pots, F. G. Gould, Excelsior.....	First	2.00
Best single plant in bloom, F. G. Gould, Excelsior.....	First	2.00
Best and most artistically arranged design, R. J. Mendenhall, Minneapolis.....	First	5.00
Best collection of roses, R. J. Mendenhall, Minneapolis.....	First	3.00

VEGETABLES.

Best display vegetables, Joshua Allen, Red Wing.....	First	5.00
Best display vegetables, R. P. Lupton, excelsior.....	Second	3.00
Best half peck early potatoes, J. A. Sampson, Excelsior.....	First	2.00
Best half peck early potatoes, R. P. Lupton, Excelsior.....	Second	1.00
Best half peck late potatoes, Mr. Pearce, Chowan.....	First	2.00
Best half peck late potatoes, R. P. Lupton, Excelsior.....	Second	1.00
Best half peck onions, R. P. Lupton, Excelsior.....	First	2.00

	Prem.	Amt.
Best half peck onions, R. P. Lupton, Excelsior.....	Second	1.00
Best half peck turnips, J. A. Sampson, Excelsior.....	First	2.00
Best half peck turnips, J. A. Sampson, Excelsior.....	Second	1.00
Best half peck beets, J. A. Sampson, Excelsior.....	First	1.00
Best half peck beets, Joshua Allen, Red Wing.....	Second	.50
Best half peck parsnips, Joshua Allen, Red Wing.....	First	2.00
Best half peck carrots, R. P. Lupton, Excelsior.....	First	1.00
Best half peck carrots, Joshua Allen, Red Wing.....	Second	.50
Best Hubbard squash, Joshua Allen, Red Wing.....	First	1.00
Best Hubbard squash, R. P. Lupton, Excelsior.....	Second	.50
Best winter cabbage, J. A. Sampson, Excelsior.....	First	1.00
Best winter cabbage, J. A. Sampson, Excelsior.....	Second	.50
Best winter lettuce, F. G. Gould, Excelsior.....	First	1.00

PANTRY STORES.

Best display canned fruits, R. P. Lupton, Excelsior.....	First	3.00
Best display of jellies, Mrs. L. D. Perkins, Excelsior.....	First	2.00
Best home made vinegar, L. H. Wilcox, Hastings.....	First	1.00
Best exhibit of comb honey, J. W. Murray, Excelsior.....	First	3.00
Best exhibit honey comb, L. H. Wilcox, Hastings.....	Second	2.00
Best exhibit comb honey, R. P. Lupton, Excelsior.....	Third	1.00
Best exhibit extracted honey, J. W. Murray, Excelsior.....	First	3.00
Best exhibit extracted honey, L. H. Wilcox, Hastings.....	Second	2.00
Best exhibit extracted honey, C. Thielman.....	Third	1.00
Best sorghum syrup (special premium). Mrs. A. A. Kennedy, Hutch- inson.....	First	2.00

E. H. S. DARTT,
EDSON GAYLORD,
ANDREW PETERSON,

Committee on Award of Premiums.

Mr. Harris from the committee appointed to consider the President's address, presented the following resolutions:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your committee have had time only to make a hasty examination of our worthy president's address, but would report for your consideration, and adoption, the following resolution, based upon suggestions and recommendations therein:

1st. Resolved, That our secretary be instructed to correspond with the State Horticultural Society of the Northwest with the view, if possible, to so fixing the dates of holding their annual meetings that no two shall occur in the same week.

2nd. That hereafter all moneys accruing from annual membership shall be devoted to a fund to be offered as premiums for the encouragement of special work such as originating new varieties by seed selection, crossing and hybridizing, and reclaiming, ameliorating, and improving, varieties of our native species of fruits.

3rd. That whenever not provided for at the annual meeting the executive committee shall, whenever the finances of this society will admit, appoint one or more delegates to represent this society at the annual meetings of the Wisconsin, Iowa, South Dakota and North Dakota State Horticultural Societies; provided, however, that no delegate shall receive any remuneration whatever, except that necessary travelling expenses shall be provided upon presenting to the society or executive committee a satisfactory report and itemized bill of expenses.

4th. That the secretary be directed to arrange the revised fruit lists on the first pages of the report.

5th. That the president be directed to appoint a standing committee of three to act and co-operate with like committees of kindred associations to bring about if possible lower express and freight rates on horticultural products transported by railroads and express companies to and from markets.

J. S. HARRIS,
E. H. S. DARTT, } Committee.
L. H. WILCOX, }

After considerable discussion the resolutions were adopted.

Mr. Cutler offered the following resolution which was adopted.

Resolved, That all bills against the society shall be itemized; and when presented by any delegate or committee appointed by the society, shall be accompanied by a written report.

Mr. Harris offered the following resolution which was adopted

Resolved, That the salaries of the officers of the society for the ensuing year be as follows: President, \$25; Secretary, \$500; Treasurer, \$25; Librarian \$10, and that the actual expenses of the executive committee in attendance when called together shall be paid.

It was moved and carried that there be appointed a committee on revision of the constitution and by-laws to report at the next annual meeting of the society, and this committee was further instructed to inquire into the workings of the director system as now practiced in Iowa.

President Elliot then appointed the following persons to serve on this committee: A. W. Latham, Wm. Somerville and M. Cutler.

The following report from the obituary committee was then presented and adopted:

REPORT OF COMMITTEE ON OBITUARY.

IN MEMORIAM.

The following distinguished horticulturists have departed this life since the last annual meeting of this society, viz: E. P. Roe, C. H. Greenman and Peter Henderson.

REV. EDWARD PAYSON ROE.

Rev. Edward Payson Roe, died suddenly, of neuralgia of the heart, at Cornwall, N. Y., July 19th, 1889. He was widely known as the preacher who turned nurseryman, and bloomed suddenly into an author, whose works were widely read by the American people, and caught the popular ear. Mr. Row was born at New Windsor, N. Y., in 1838. In the late war of the rebellion, he was chaplain of the Second New York, or Harris' light cavalry, and was afterwards one of the chaplains at the Fortress Monroe hospitals. At the close of the war he accepted a call to the Presbyterian church of Highland Falls, N. Y. In the spring of 1874 he removed to Cornwall, on the Hudson, where he began the somewhat extensive cultivation of small fruits and plants, and soon became widely known as a successful fruit grower, as well as novelist.

PETER HENDERSON.

Peter Henderson, so widely known as gardener, florist and seedsman, died at his home on Arlington avenue, Jersey City, N. J., January 17th, 1890, from pneumonia, following the prevailing in-

fluenza, in the 68th year of his age. He was born in 1823, in the village of Path Head, near Edinburgh, Scotland. His early education was obtained in the parish school. He was always a close observer, and had a faculty of turning his observations to good advantage. He early became interested in botany and the arts associated with it. At sixteen he was apprenticed to a gardener. At the age of twenty, with little capital excepting energy, industry and a strong constitution, he came to this country and entered the employ of J. M. Thorburn & Co., Astoria, Long Island. By frugality he accumulated a small capital, and in 1847 began business as a market gardener, in Jersey City. This business he followed with success for about twenty years, when he began the cultivation of ornamental plants, and the business became so great that market gardening was gradually given up. A little later he became a seedsman, and at the time of his death was accounted the most successful and widely known seedsman in America. He was a concise and able writer on subjects pertaining to his business, and his productions were the most widely read of any author of the day. His contributions were always welcome to any horticultural publication, and his books among the best selling of any published. He was indefatigable in his efforts to extend his business, courteous and kindly in nature, and the inspiration of many a young gardener and florist.

C. W. GREENMAN.

C. W. Greenman, died at Chatfield, Minn., Dec. 9th, 1889, of congestion of the lungs, after an illness of five weeks. Mr. Greenman, was born at Leanedsville, Madison Co., N. Y., on March 11th, 1832. He removed from New York, to Wisconsin, the year 1854. He was engaged in the nursery and fruit growing business at Milton, Wis., and Wauwatosa, Wis. the greater part of the time until 1884, when he removed to the state Minnesota, engaging in the same business at Chatfield, Fillmore Co. He was regarded as one of the pioneer horticulturists of the Northwest, and the places where he has lived, will long be able to show evidences of his unselfish devotion and untiring energy in the development of the art we love so well. He was an honored and active member of the Wisconsin State Horticultural Society, from its organization; a co-worker with J. M. Smith, S. Stickney, Geo. J. Kellogg, G. P. Peffer, and J. C. Plumb, whose names have become household words with us. He was a skillful propagator of trees and plants, honest and up-right in all business transactions; a public spirited citizen, and a kind hearted and affable friend and neighbor. His works do live after him, and the world is better for his having lived in it. He leaves a widow, and two daughters, aged respectively 9 and 14 years, who has our heartfelt sympathy in this their great bereavement.

CHARLES A. CRANDALL.

The silent reaper, death, has taken from our ranks a bright and promising young man, from whom we hoped much; an upright citizen of Minnesota, a practical farmer and earnest and skillful

horticulturist. Charles A. Crandall, died at his home at Sumter, McLeod Co., Minn., March 21st, 1889, at 6 P. M., from an attack of measles followed with pneumonia, aged 23 years. 3 months and 21 days. He was the son of Ethan and Margaret A. Crandall, and was born at Portage City, Wis. His parents settled in Minnesota in 1869, and he grew to manhood on his father's farm, and for several years had charge of his small fruit business, conducting it with marked success. He was highly esteemed by all who knew him, as a dutiful son and amiable brother, and a consistent member of the Congregational church. The sorrow stricken parents and surviving sister and brother have our heartfelt sympathy in this their great affliction.

Respectfully submitted,

JOHN H. STEVENS,
JOHN S. HARBIS,
S. D. FILLMORE,
Obituary Committee.

On account of lack of time for reading before the society the reports from experiment stations they were referred to the publication committee for revision and publication.

The report of the general fruit committee was then referred to the committee on publication.

It was voted to continue the committee on legislation and to refer to the executive committee the appointing of all other committees.

After much discussion of the work of the seedling committee the following motion prevailed.

That the chairman of the seedling committee as appointed by the executive committee shall be authorized to make the necessary investigations and that a sum of money shall be appropriated to pay the actual travelling expenses of this person.

The following reports were then successively referred to committee on publication. Report from bread and cake committee. Reports of seedling commission. Report of committee on exploration of fruits and flowers. Report on floriculture.

DISCUSSION OF EXPERIMENT STATIONS.

After considerable discussion as to the desirability of appointing a committee to visit the paid experiment stations of the state, President Elliot appointed Messrs. Dartt, Latham and Wilcox to draw up a resolution covering the point. They reported the following resolution which was adopted.

Resolved, That the chair appoint a committee of three, of which he shall be a member, to examine the Central Experiment Station and the Owatonna Station and report at the next annual meeting.

President Elliot. What shall be done with this stuff that is raised at experiment statsons, how shall it be disposed of so as not to come into competition with our farmers and fruit-growers

Mr. Wilcox. I move that it be disposed of by placing it with suitable persons in different portions of the state.

Mr. Sampson. If there was an experiment station near me I would be perfectly willing that that experiment station should be all the advantages it could from sales. If I could not live under it, I would move somewhere else.

Mr. Dartt. I presume you wont prohibit me from reading this article: "The greatest obstacle in the way of rapid progress thus far, seems to have been the want of funds to purchase stock and make necessary improvements. Judging the future by the past, the question arises, shall we plant with a view of selling trees to help pay expenses? I have given this subject much thought and am confirmed in the belief that no man who runs an experiment tree station at public expense should be engaged in selling trees."

Mr. Wilcox. I am a firm believer in the benefit of these object lessons. Now, I have been struck more by that, than anything else in showing the surroundings of Mr. Somerville, and showing how much good a liberal distribution has done in that section. I believe it would be the best thing for this state to develop its ever-green and grape interest, for instance, by experiment stations. If I were running one and running it as I wanted to, I would start fifty thousand grape-vines, and give every one of them away where they would do good, and make some portion of each county an object lesson for that section. I don't care how it is brought about, sell them if you can get anything for them.

Mr. Pearce. Do you propose to starve all the honest nursery-men to death?

Mr. Wilcox. If I were an honest nurseryman in the state of Minnesota and selling grape-vines, I would contribute \$500 towards supporting an experiment station that would start desirable kinds and would place them in the hands of men that would make them a success in their locality.

Mr. Somerville. Until this thing is established, so that we can distribute some trees among the public, gratis, we will never succeed in getting trees planted very far over this state, for the reason that people have no confidence in them, to start with, and the next thing is, they don't know how to take care of them. They think they can raise calves and trees in the same lot together, and every time such a mixture proves a failure. Now, in order to get a start in any community, this stock must be given without price. We

must send a strong man out to hunt up the leading men in every section; to correspond with them, and to send them some trees. He must get a few trees started in every community, and then we will soon get sale for all the trees that Bro. Dartt can raise. This must be the plan for the present. Just start the thing and it will run itself.

Mr. Dartt. I would like to give some of the reasons why I think a man, raising trees at public expense, should not sell them. Now, as much as we may deplore the fact, a man is more or less influenced in favor of the things he has to sell. I think you will all agree with me there. If he has something that he wants to get money out of, his sympathies naturally incline that way. In my case, I don't think I am big enough or have brains enough to run that experiment station properly, and at the same time run a commercial nursery; and I don't think I ought to be asked to do it, or that it would be wise to have me do it. At the central station it might be a little different, but on general principals, I believe it is better for those who receive compensation from the public, not to sell trees for profit. There is another point in this matter of selling trees. Now, if it is the plan for me to sell trees to help pay expenses, I must start a nursery with that view, and it costs money, and I have not the money to command, but if I adhere strictly to experiment work, I only need ten or twelve trees of a kind, and could put a lot of money into straight experiments that otherwise would have to go into young stock.

Mr. Pearce. I look at this experiment work from Mr. Dartt's standpoint. I do not think his business is to grow trees for sale. It is experiment work entirely. He is there for experimenting, and we expect him to report to us the success he is having in the experiments he is making. Well, now, when he gets a good thing and is perfectly satisfied with it, then he should send to all the different parts of Minnesota or Dakota, two or three of each of those varieties, and have them tested. That is what I call tree experiment work. But there must not be one dollar coming back to him, or the station, because he is working for the good of the public.

Prof. Green. As I look at this matter of sending out trees it strikes me in this way. I find, and I know that other people have found, that where people pay a small price for a thing they are apt to take more care of it than if it is thrown into their hands. People don't take much care of things that cost them nothing. I think it is all right for experiment stations to send out at a moderate price, desirable novelties in small quantities.

Mr. Dartt. That would be good for the Central Station but not so good for the Owatonna station.

Mr. Wilcox. I want to ask Prof. Green if the experiment station sent out fifty vines into every favorable location and the parties receiving them made them an established success, if he does not believe it would be a benefit to every nurseryman in this state?

Prof. Green. I have no doubt it would be a benefit. I believe it would be a good thing; but I do not think it is the office of an experiment station to do such work. That is not experiment work.

On motion it was then voted that in the opinion of the society it was unwise for paid experiment stations to raise trees for sale.

Mr. Harris then offered the following resolution:

Resolved, That our thanks are due to Mr. and Mrs. Burnett, of Manitoba, and Edson Gaylord, of Iowa, for honoring this meeting with their presence and expressions of good will, and that we extend to them the usual courtesy of an honorary membership for the term of five years.

REMARKS BY MR. BURNETT.

Mr. Burnett, Mr. President, Ladies and Gentlemen:—I must express to you my thanks for the honor you have conferred upon me in electing me a member of your society for five years, and I can only say that at the expiration of that time I hope to know more of horticulture than I do now. I came down here something like the heathen in his blindness, as far as horticulture is concerned. I have been up among the polar bears groping in the darkness. I can tell you that after having bought a good many trees, etc., for years from tree agents that have come along, I am well convinced that there are many things that will not grow in Manitoba and I thought I would put an end to such buying and find out what to do by attending your meeting. I must say that the members of this society have never shown the slightest sign of impatience in giving me all the information they reasonably could. I think what I have learned will be of great benefit to me when I get back to Manitoba. I think I am going back filled with some little idea as to what is the proper course to pursue in the future. I cannot sit down without thanking you for the very kind manner in which we have been received by the citizens of Excelsior; they could not have received us better than they have done, and I only hope that if any of the citizens of Excelsior ever come to Manitoba they will enquire for Frank Burnett, and I am sure he will try to extend to them the same hospitality that they have extended to him and Mrs. Burnett.

Mr. Latham. There are always some matters that come before

the meeting in the shape of letters and reports that have been crowded out by the amount of business and are not read before the meeting. I would move that all such matters be referred to the committee on publication, for them to decide what portions shall be printed with our reports.

President Elliot. Before that motion is put I would say that we have papers from both Mr. Sias and Mr. Underwood; a communication from Mrs. Kennedy on horticulture, and there is also the president's address from the McLeod County Horticultural Society and a report on early vegetable raising by Mr. Allen. These we have not been able to reach, which I regret very much.

The motion was seconded and carried.

After some discussion of the report of the committee on revision of the fruit list, the following motion prevailed:

Resolved, That a committee be appointed to prepare three fruit lists which shall be submitted to the executive committee for their approval.

The following committee was then appointed by President Elliot: J. S. Harris, for the southern district; A. W. Latham, for the central district, and R. M. Probsfield for the northern part of the state.

Mr. Dartt. And the first lists are to go to the executive committee.

Mr. Harris. Do we understand that covers the whole report, or only the apple business?

President Elliot. I think the whole business. I shall so rule unless the society consider it otherwise.

COMMITTEE ON CATALOGUE AND CLASSIFICATION.

Mr. Wilcox. There is one branch of the work of this society, the cataloguing and classifying of fruits, that is a very important matter, and as the chairman of that committee, I will report progress. I am not ready to report in full. We have been at work for some time. Mr. Harris is preparing a very able and extended description of apples and plums, and I have been giving my attention to the small fruits; and the more we do, the more we wish to do. We want to make it a very complete report, and one that will be a credit to this society, and a general help to the whole northwest. We found it impossible to report in full at this meeting, and it will take considerable more labor before closing it up.

The committee was continued.

REPORT OF COMMITTEE ON NOMENCLATURE.

Mr. Harris reported that no work had come before the committee this year.

President Elliot. We have with us a gentleman who perhaps

has given more direct thought and attention to the cultivation of fruit in favorable and unfavorable circumstances, perhaps, than any one man in the northwest, and he wishes the privilege of speaking to you for fifteen minutes. I refer to Mr. Gaylord, of Iowa.

SUN-SCALD.

By Edson Gaylord, of Nora Springs, Iowa.

I thank you most kindly for giving me this opportunity to talk a few moments with this intelligent body of horticulturalists, who have gathered here from Manitoba to Iowa. The subject I have been requested to present here, will, upon examination, be found to be one which all apple growers cannot afford to pass without serious consideration; as it embraces the grave causes that, more than all others, hinder successful apple growing in the northwest, viz: sun-scald. We hope that in this investigation we shall be able to present a remedy so plain and practical that a child need not err in applying it with entire success.

In settling at Nora Springs, in Iowa, in 1853, we found a few hundred acres of the most noble of deciduous trees I ever had the pleasure to behold. There were ash over one hundred feet high, oaks and black walnuts, nearly, if not quite, as tall, and many over four feet through at the ground, and quite a number of each of the latter fully five feet through. We had many fine butternut trees nearly as tall, and as perfect, and as free from sun-scald as could be. The town was located near the centre of this grove. The old trees fast disappeared before the woodman's axe, and in their place there came up hundreds of young trees, many of which were left along the streets, in vacant lots and corners, for shade and ornament. These were mostly trimmed up, and in a few years were nearly all found with more or less of of their trunks leaning from the sun, and in all these cases the bark and sap wood was found dead and rotten, often rotten to the centre of the trunk. What strikes the casual observer with surprise is these unerring facts as they present themselves, viz: all trees susceptible to sun scald, such as butternut, blackwalnut, maple, hickory, ash, cherry, and every variety of our common apple are found dying or dead if they lean from the sun. While all of the above varieties, and many others, if found leaning to the sun, are perfectly sound and healthy. Even where they start from the same stump and grow to the sun they are invariably found

sound. If *from* the sun they are universally found dying or dead. All through the groves and thickets where they protect each other from the steady direct rays of the sun from 9 a. m. until 4 p. m. they are found perfectly sound, no matter how much they may be found leaning from the sun. By no means is it necessary to have their trunks entirely shaded to prevent this injury. Anything that will partially shade the stems will effectually disarm the evil effect of the sun. A limb or bush placed on the sunny side will entirely protect from this evil. It is the steady continuous rays of the sun for two or three hours that puts its dead marks on very many varieties of both fruit and forest trees. I have found it impossible to grow any variety of the apple tree, with a high trunk and no protection, except it be grown to the sun. I have grown them with high tops, with low tops, and with leaning trunks. High tops should always be avoided in the northwest, as such pave the way for long years of watchfulness and care, to keep such a tree constantly protected. All trees leaning fairly to the sun are self protected, and if so kept till the trees are thoroughly established, will cease their inclination to grow off to the northeast. Trees branching low and properly trained are self-protecting; but rabbits and mice, to say nothing of sheep and calves, are always constant foes to the low headed apple tree. Then head your apple trees three or four feet high, set the main branches towards half-past one o'clock, keep all branches off from the northeast side till the tree has borne three seasons, and then the tree will cease to stray to the northeast, and will build itself up in the way it should go.

REPORT OF THE COMMITTEE ON FINAL RESOLUTIONS

Resolved, That the thanks of the members of the State Horticultural Society are tendered to the St. Paul and Minneapolis Passenger Association for their generous treatment of our members in the reduction of fares to and from the place of our annual meeting by said association, representing the following lines of road, viz.: The Chicago, Milwaukee & St. Paul; the Chicago, St. Paul, Minneapolis & Omaha; The Chicago, Burlington & Northern and The Chicago, St. Paul & Kansas City; The Minneapolis & St. Louis; The St. Paul, Minneapolis & Manitoba; The Northern Pacific; The Minneapolis, St. Paul & Sault Ste. Marie; The Minneapolis, St. Paul & Duluth and the Eastern Railway of Minnesota.

Resolved, That our most hearty thanks are due to the good people of Excelsior for their wise forethought in arranging for our meeting here, and in anticipating our needs, and in providing for our comfort during our stay here among them.

Resolved, That our thanks are also due the committee who watched the arrival of trains, received and conducted our members to pleasant homes (for it was the time of keeping open house) and made us feel that our presence was needed to complete the family circle.

Resolved, That our thanks are especially due to the Marys and Marthas of the village who spread the feast of good things before us and ministered to our inner wants, giving to each a reserved seat at the banquet board, and where the last of the wine was kept for the best of the feast; and while Martha was busying herself about many things on our account, Mary was choosing her better half or words to that effect, and finally

Resolved, That our thanks are due to the angels and our lucky stars that we have been taken so unanimously unawares and have been so highly entertained; that our souls are so enchanted and filled with music's charms that they are bubbling over with hallelujahs—Excelsior.

J. T. GRIMES.

FRANK BURNETT.

The resolutions were adopted.

President Elliot. I must say that as far as I am concerned, personally, this has been a very pleasant occasion. I have been very much gratified with the hearty good-will and good-cheer that we have all had given us here and I hope that we may have many such gatherings, and that we shall strive, wherever we go, to try to give the people the best entertainment that we know how. And while on our part we appreciate what they have done for us, I hope that as we leave them they will feel that we have not labored in vain to do whatever has been our purpose. I hope that each one, as he takes the train here, will bid them a hearty good-bye, and wish that he can come back to them again on some future occasion,

Mr. Allen. I would like to add one word. When I enlisted here to defend our country, the recruits were delayed at Philadelphia, and of course we had to remain there two or three days, and the people of Philadelphia some way or other were so cheerful and so bright, and made everything so homelike for us, that it made me a better union man, a better man to fight for the flag. So after this meeting here at Excelsior, I can go on and be a better horticulturist than I have ever been before.

REMARKS BY J. S. HARRIS, OF LA CRESCENT.

It is always expected that the old man will say something. I have been much pleased, very much gratified with this meeting at Excelsior. My sons have come up here, and they have behaved themselves nobly. They have responded in earnest; and shown that they are going to follow the old man's advice and after he is laid aside they are going to keep this work rolling along. My eldest son Mr. Somerville is here; he towers above me in many things, and he has done better work here, than he has ever done before, and I hope he will be a bright and shining light that will shine over our heads. He is a farmer, and not a professional man, but he is a man that talks from genuine experience.

To the citizens of Excelsior:—We came here as missionaries to

advance this State Horticultural Society and the cause of horticulture throughout this state, which we love so well. Now, it is human nature to love that which is dearly bought, that which has cost us something. The State Horticultural Society has cost us old fellows, a great many years of hard work; a great many disappointments; and a great many trials. And we love the state and the cause because it has cost us these hardships now one object that we had in view was to benefit the immediate community or vicinity in which we held our meetings. If our deliberations have inspired anyone around Excelsior, around this garden of the northwest; to go on and put some of the things which have been brought up here into practice; if it will be the means of adding one more rose bush upon our lands, or one more ornamental shrub; if it shall be the means of prompting any of the boys or girls here during the spring which is sure to come, to go and help their fathers and mothers ornament their homes, and prompt them to make the first steps in this great study of horticulture, we shall feel we have been well paid for coming here. You have made it a very enjoyable time for us. We have never been treated anywhere in Minnesota better than we have been treated here, and yet we feel that Minnesota is the best place in the world to live in, because of the generosity and hospitality of its people. I hope you will certainly improve through the influence of this meeting. I hope to hear before long that you are taking steps to organize a local horticultural society. There is not a place in this whole country where you can sustain a local society better then you can right here. You have so many engaged in raising grapes, raspberries, strawberries and other things, and in ornamenting your places to make this such a beautiful summer resort, why can't you take steps to organize a local society and keep it up? Over in La Crosse we had been trying to run a horticultural society and for a long time held the meetings in one place. It finally dwindled down to a dozen person, and sometimes less. Some suggested putting argiculture and dairying with it, but we finally adopted the plan of holding our meetings in different sections. We went out to a small town and got together there probably about one hundred people; the boys and girls came and the little children, and when we got known to each other somebody came in and called us to order and we assembled around a board that was good enough for a Thanksgiving, and we discussed that feast and then went back to work.

We had another meeting in a place, where it was said we wouldn't have more than four or five persons, and what was our surprise to

find, an hour and a half before the opening of the meeting, people wending their way to the place where the meeting was to be held. It has made farmers and horticulturists better acquainted, and the oftener they meet, we find the better they turn out.

Now, people of Excelsior, do organize a local society and do not let it die out.

Mr. Somerville. Ladies and Gentlemen. As a dutiful child I don't want to be a disgrace to the parent. I remember the time years ago when my friend, Mr. Harris, called a few of us in Rochester, from the agricultural society, and organized this society. Since that time, we have had a great many ups and downs, in the cultivation of fruit and yet we have all had many successes and some satisfaction. This is the first time I have ever been in Excelsior, and I truly feel thankful for the kind attention and usage I have had in this place, and I find that the ladies of Excelsior cannot be beaten in getting up a good dinner.

Mr. Gould. I think that the high compliments that you have paid the people of Excelsior, ought to be acknowledged by someone; therefore, I want to say that the invitation extended to the society by the people of Excelsior was unanimous, and that we have all endeavored to make you at home in our midst, and we hardly think we are worth all the flattery that you are pouring out upon us; still, we feel gratified, of course, and I wish to make that acknowledgement. I hope that the time will come around again when we can have you here.

Mr. Latham. I want to say that the citizens of Excelsior feel more than repaid for the little trouble this meeting has been to them. The burden of the meeting has been divided among us. The very interesting character of the meetings, and the large attendance of our own people, show that we have been deriving a great deal of benefit from these meetings, and I believe we are repaid for what we have done for you.

If you do not come here next year, it seems to me that the right thing for our society to do, is to go to some other town where there is a horticultural interest, and create another center of interest such as has been created here. The outcome of the meeting here, we may not be able to see; but it has certainly given a great impetus to horticultural pursuits. The talk we had last night, and the meeting this morning, has certainly been one of surpassing ing interest to us. I was astonished at the development of the horticultural industry in our town, and I am sure we shall reap a great benefit from this meeting.

Dr. Perkins. I have been pleased in listening to the remarks

here to-day on these resolutions; and pleased because we were determined to succeed when we began to entertain you. Now, we had no means of knowing whether we had succeeded in doing this, except by the expressions you have given here. I just want to impress one thought, do not imagine for an instant that you are under obligations to us. We certainly are more than repaid by the splendid entertainment we have had in these meetings, by the information we have got individually and collectively for every dollar that has been expended.

President Elliott. There is one matter I want to present to the society if they will come to order and keep still. It is in regard to horticultural societies of various kinds, we have in our state the Minnesota Florists' Society. We have at Minneapolis the Minnesota Florist Club, and there are other organizations that we would like to have come in and join us. We would like to have the interest of their members with us, and we have thought of extending to them an invitation to come in and become members. The matter was brought up before the executive committee this morning and they thought it was a wise thing to do and I believe there was some resolution prepared.

Now, to make this official, if some one will introduce a motion that we print lists of florists, nurserymen and commercial gardeners that become identified with us, we can send that motion to these people with an invitation to become members.

The following motion was then carried:

Resolved, That a list of nurserymen, florists, and commercial gardeners in the state of Minnesota, be published with their addresses in the annual report, provided they are members of the Horticultural Society, and that the secretary notify all of that class that they may have an opportunity of such publication.

President Elliot. I don't know of anything else to finish up but I would state this: It is important that the officers of our society and the secretary get out our report just as soon as possible. If we can get it out by the first of April, it is the thing to do and have it ready for early distribution.

The following motion was then carried:

That the executive committee be instructed to arrange for a summer meeting at the most feasible time and place offered.

It was decided to continue the meeting during Friday evening as the interest was very great and there were many deferred reports and papers.

FRIDAY EVENING SESSION.

The meeting was called to order by O. F. Brand vice-president, A. W. Latham being chosen secretary pro tem.

J. S. Harris read an article entitled "Three periods of successful fruit growing in the northwest."

E. H. S. Dartt followed with a report from the Owatonna experiment station. It was accepted and ordered placed on file for publication. (It will be found elsewhere in this report).

L. H. Wilcox then read the following paper on "Fruit Blossoms."

FRUIT BLOSSOMS.

By L. H. Wilcox, of Hastings.

The best means God has provided for the permanent improvement of fruits, and their adaptation to dissimilar climatic conditions is by their production from seeds under more favorable conditions for attaining perfection in the qualities desired, than nature itself supplies. In the blossoms we have the germs of future possibilities before us, and the foundation on which with skill and knowledge we can build their progressive development.

In some lines of work, science has made commendable progress; in others comparatively little. Mechanics, manufacturing, commerce and stock-breeding, have received the careful study of our most brilliant minds for centuries, while scientific plant growth—of more value to mankind than either,—has received none of that systematic study its importance demands. It has taken hundreds of years of careful systematic breeding, to build up and improve our standard breeds of cattle to their present excellence, and who would now expect any desirable results to follow a single chance cross of "scrubs", yet this is all our best horticulturists have been doing; crossing plants of some individual merit, but of unknown parentage and then perpetuating their defects by further outside crosses, before any fixity of character had been obtained. If in the crude way of these scientists some phenomenal results have been secured, what may we expect when scientific specialists endeavor to attain our ideal, by placing present plants in the most favorable condition for perfect development of the seed, and its surrounding receptacle, and by methods now well known, develop desirable and eliminate defective qualities as its successful progress requires.

When we consider that the art of hybridizing species and crossing varieties for their improvement is a recent discovery and is practiced only in a chance hap-hazard way even at the present

time, we may truly say the results have been wonderful. Yet for the want of a practical horticultural knowledge, careful systematic labor, and above all the ability to translate the language in which the great Book of Nature is written, among our experimentalists, we have failed to spread before mankind the beneficent blessings clearly within our reach.

Within the stigma of the blossoms we have the ovule the creative place of future life, sensitive to surrounding influences and easily changed in the form of the succeeding development by the agency of man, and here is the true starting place from which must proceed all substantive progress in the improvement of our fruits.

Variations of form and structure are so easily affected by artificial means in most Phaenogamous plants and especially in the great rose family to which our fruits belong; and desirable variations may be so easily fixed by successive systematic breeding until races, if not new species, are established of superior excellence and utility for the purposes desired that it opens a promising field of research to those who wish to go down to posterity as benefactors of mankind.

To the torus the ovaries and the pistils of the blossoms in both the parent plants we should look for the most available basis for improvement and in those small fruits like the strawberry which is not a true fruit but the enlarged fleshy end of the flower stalk, or the raspberry which is a compact cluster of a number of independent stone fruits, and the blackberry a combination of both forms, the number, form and perfection of the pistils and a large-celled thick meaty pericarp have a much greater influence in forming the size and condition of the enlarged receptacle fruit than even the pollen itself.

The same general rule here suggested, holds good throughout the whole family, with such specific variations as their various forms of construction may demand. Our present fruits are the result of an indiscriminate mixture of all varieties within the limits nature has prescribed. So, to be assured of any substantial success, we must first cross in a way to secure parent plants of certain fixed tendencies on which we can rely, and then by intelligent study of these tendencies, correcting form and improving quality, by similar strains of pedigree pollen, secure increasing size, vigor and productiveness by judicious use of foreign blood, and by bringing to our aid all our present knowledge of plant life, the laws of heredity, the rules of variation, and the ways of successfully fixing varieties, as races and true species, as a basis for subsequent breeding, we may assist nature in improving the utility of her products. When parent plants are too closely allied, the vitality of their progeny will be impaired; if too distant, no individual formation will occur. The prepotency of foreign pollen is well known. Bi-sexual flowers never fertilize themselves when other pollen is available. The in-breeding of animals weakens vitality; so self-pollenization destroys vigor. Hybrids are usually strong and healthy at first, but without proper care in fixing their characteristics, they degenerate, and their progeny are worthless.

The limits fixed by nature may be somewhat extended by artificial means and hybrids produced outside its common course, and any deviation from the established order gives some promise—perhaps one chance in a thousand—of progressive results. Like produces like within certain well defined limits, so the pollen which is used in establishing successful crosses should be taken from those blossoms having the most pistils, the thickest ovary walls and most perfectly developed embryo receptacles.

By some law of selection nature in certain cases obliterates in the growing fruits superfluous parts which existed in flowers at the time of blossoming and this can be effectively used in securing the results we desire, but as a general rule our fleshy fruits—with the exception of the apples which is formed mostly from the calyx—are dependent for their perfection on the condition and vigorous vitality of this position of the blossoms. While we endorse the plausible theories of Darwin and assist nature in the evolution and transmutation of species we many expect the survival of the fittest will induce every variation in plant life without artificial aid to revert towards its natural condition, the survival of the most vigorous to resist disease, enemies and the natural obstacles they encounter with no regard to their ability to contribute to the wants of man. The ideal fruit will never be the unaided product of nature but the result of skillful artificial crossing in conformity with God's great fundamental law of reproduction, which will remain unchangeable while plants grow and the elements of nature perform their work.

Adjourned sine die.

DEFERRED REPORTS AND PAPERS.

NOTE—The following reports and papers could not be read before the society for want of time, and were referred to the committee on publication for revision and publication.

CENTRAL EXPERIMENT STATION.

REPORT OF PROF. S. B. GREEN, ST. ANTHONY PARK.

Mr. President and Members of the Minnesota Horticultural Society:

It is with much pleasure that I make my second annual report to you, and before doing so I want to thank you for the uniform courtesy and aid which you have extended to me in the prosecution of my work. This society has done and is doing much valuable work in northern horticulture. It stands in a field distinctively its own, and one as important as it is distinct. There never was a better opening for experimental horticulture than there is to-day. I want to make our part of the central experiment station a success, but I feel that I must have your earnest co-operation and support in order to do this.

In this report I purpose only to touch on some subjects not mentioned in the bulletins which have been issued.

PUBLICATIONS.

The publications issued by the horticultural department of the experiment station in 1889, have been as follows:

Annual report for 1888, of over one hundred pages.

Bulletin No. 5. Containing a report on comparative tests of sixty varieties of cabbage; descriptions and drawings of native plums; new method of potato culture; propagation of Russian willows and poplars from cuttings.

Bulletin No. 6. Devoted entirely to a report on the germination of frosted and rusted wheat, with criticisms of the results by practical men.

Bulletin No. 7. Report on many varieties of potatoes cultivated on the station land; value of differently constructed walls for buildings, with report on their relative conductive capacity.

Bulletin No. 9. Contains our information, up to date, on the newly introduced Russian willows and poplars.

RUSSIAN APPLES.

Perhaps I should first mention the progress made at the station, in the cultivation of our Russian varieties of apples. As I said last year, I do not propose to draw conclusions in this matter from

results obtained outside of the state. Our trees have made a very satisfactory growth the past season, and are in better condition now than ever before. As they have now been planted here five seasons, it seems to me that, shortly, we must have some fruit from them. A few varieties blossomed last year, but the flowers were nipped by the late frost. Our most promising trees in point of hardiness are, Antonovka, Dobruii, Krestiana, 4 M—, Simbirsk, Yellow Transparent, and Green Streaked. Among the native apples added to our list are, Northwestern Greening, from the originator, E. W. Daniels; Baldwin Seedling and Mills Seedling, from G. W. Fuller. From Peter Gideon I have a collection of trees and scions of all of his most promising kinds, from Wyman Elliot scions of Pride of Minneapolis crab and various other seedlings.

I now want to correct the impression which has gone abroad, that our Russian trees were only root grafts when planted here. They were two year old trees when received by Prof. Porter from Ames, Iowa, and are now seven years from the graft. I have added twelve varieties of Russian apples to our collection the past season, which were considered worthy by Prof. Budd.

RUSSIAN PEARS.

The varieties Bessemianka and Waxen are quietly disproving the statement that pears cannot be grown in this state. We have ten trees, and they are as thrifty and vigorous as one could wish to see. They are eight feet high, and well branched. They have not yet fruited, but I can see no reason why they should not do so. On the 27th of last August, Prof. Budd wrote me that he had that day eaten fruit of Bessemianka, and he pronounced it a good pear. I have this season, added six varieties to the list of pears already on hand. These pears graft easily. Out of a lot of nearly four hundred root grafts made last March, not over ten per cent failed to grow.

RUSSIAN CHERRIES.

I have added to our list of this fruit until we have now sixteen varieties. I think this a very promising line for experiment and it shall be thoroughly worked. At Ames, Iowa, last summer, I saw many of these varieties in fruit, and they appeared to me extremely promising. I think we shall yet grow cherries of a fine quality in a bush form. These cherries are of good size and of most excellent flavor, and vary very much in season of ripening and appearance of growth.

RUSSIAN PLUMS.

I feel quite certain that we shall not obtain from Russia any better plums than from our native species, yet I propose to give them all a fair trial and with this purpose in view, I have secured a collection of all the Russian plums sent out by Prof. Budd.

NATIVE PLUMS.

Our collection of these is fast increasing by the addition of new and valuable varieties, and I want to prophecy that in the near future we shall see many improvements. This is a most important fruit and cannot be worked up with too much care. I shall plant largely of selected seeds next spring.

What we want is a plum as good as the best of our natives, or better, with a thicker skin, which will permit of shipping to different points. The Rollingsstone plum fruited with us, for the first time, last year, and is a desirable acquisition. Drawings and a description of it will appear in a future bulletin.

GRAPES.

Our grapes came through the winter in fine shape, but after uncovering them we had a severe wind storm, which seriously injured the weaker varieties. The late frost did not much injure our crop. Among the varieties fruiting with us for the first time, was Early Victor. This variety has sustained its reputation for early and heavy bearing, early maturity, and good fruit. Its season is about with that of the Janesville, but it is much sweeter. It is not a variety I should recommend for the commercial vinyardist, but for the amateur or farmer who wants to grow his own grapes without much care, I recommend this as one of the most desirable. However, it can never take the place of the Worden, Brighton, or Moore's Early as a table grape, where these can be grown. I think it could be grown over most of our state. Our specimens of Massasoit were of exceptional flavor. Our standard varieties, such as Worden, Moore's Early, Brighton, Lady and Agawam, ripened well. The Worden is fast proving its great value. The Concord did not ripen with us. Among the new vines added to our collection are Woodruff Red, Moore's Diamond, Eaton and Moyer.

STRAWBERRIES.

Our beds are doing well and contain most of the newer varieties. I mentioned the most desirable in my article on strawberry culture. We have about a hundred seedlings of our own growing, and it is my intention to make the raising of seedlings an important feature of the work.

RASPBERRIES AND BLACKBERRIES.

These berries have not generally done well at our station the past season. Most of the raspberries have been affected by rust, which together with the dry weather nearly destroyed the crop. A few varieties fruited well, and among them of interest are:

Golden Queen.—This is a yellow cuthbert, vigorous and healthy in growth and prolific in fruit. Season late; canes rather stiff.

Hansell.—Prolific, sweet, large, healthy, and early.

Clark.—Vigorous, healthy, large, solid, of medium quality, valuable.

Caroline.—Vigorous, productive. Fruit too soft for marketing, but a good family berry. On account of its flexible, tough canes, it may easily be laid down and covered.

Our blackberries were so much injured by the dry summer that they ripened scarcely any good fruit.

SAND CHERRIES AND JUNE BERRIES.

The juneberries, Chester Center and Osage, fruited with us the past season, and appear to be valuable fruit. We have several other

varieties on trial. We are collecting sand cherries from many sources, and some are said to be most desirable. I hope to get a variety of good size and flavor, that will fruit freely on rich land. It generally prefers a sandy location, and fruits but little on rich soil.

SHRUBS, TREES AND HERBACEOUS PLANTS.

We have largely increased our list of these the past season and intend developing our lists of desirable hardy kinds to the utmost.

VEGETABLES.

In connection with experiments with vegetables, we do not intend to make this department very prominent, but only to carry on sufficient trials to keep our bulletins up with the times.

TOMATOES.

This year we have tested some forty-five strains and varieties of this fruit and shall publish the results in some future bulletin. I will mention a few of the new kinds:

Lorillard. This variety has been extensively advertised as a forcing tomato, but for out-door culture we have many that are better.

Dwarf Champion. One of our earliest tomatoes. Fruit nearly globular, sometimes a little flattened, pink, solid, of medium size, productive and desirable. Plant compact but not at all like the upright class. A valuable acquisition.

Upright Tree, and Station Upright, Tomatoes. These three are practically the same and none of them are worth cultivating.

Shah. Large smooth yellow tomato.

Golden Rod. Yellow and smooth, but very tender.

Peach. This is peculiar, being nearly round, with a rough skin and about the same color as a green peach; whence its name. It is only worth noticing as a curiosity.

SQUASHES.

Among the new varieties worthy of mention are:

White Chestnut. This is an acquisition, being a remarkably dry, good flavored Fall or Winter squash, much earlier than the Hubbard; as large as the Boston Marrow which it resembles in form. Shell white and hard, flesh yellow. It cooks as dry as a good sweet potato.

Sibley. I am a little disappointed in this, for it is not so large or so thick meated as I expected. Not desirable for there are several better squashes.

Strickler Summer Squash. This is a large yellow crook-neck variety, without the crook, being nearly straight. Early, large and excellent. The best early summer squash I have ever seen.

Early Orange Marrow. This is like the old Boston Marrow, but with a darker colored shell, and earlier. Valuable.

Mammoth White Bush. This is an improved scallop, of good form and large size. Bush very compact.

ONIONS.

The only new onion that is worthy of mention is the Prize Taker.

It is very large, many specimens weighing a pound and some a pound and a quarter. It is very tender and resembles the Bermuda Onion in color. About as strong as the yellow Danvers. They keep fairly well but do not "cap well." It will never take the place of our standard varieties, but probably a few could be sold in most markets at an advance over our common kinds.

Early Red Danvers. This is an improved strain of Early Red Globe, sent out by J. J. H. Gregory. It is a desirable red onion, and the largest cropper of the very early kinds. It ripened well capped bulbs by August 20th, last year.

AMERICAN GROWN CAULIFLOWER SEED.

Samples of seed from Fidalgo, Washington Ter., yielded good heads of cauliflower. If this seed should prove as good as the European strains, and I think it will, it must prove a great boon to gardeners, for it can be bought at a much lower figure than the European strain.

POTATOES.

Many new kinds have been grown, but will be reported on, in a bulletin, later. We are growing some four hundred different potato seedlings of our own raising.

TREES WATERED IN THE FALL.

A year ago last November, Mr. J. S. Harris wished the experiment tried of watering fruit trees on the approach of winter, as the soil was then very dry. This was done, but as the winter was a mild one, and was not accompanied with much winter killing on our land, there was no apparent difference between those watered, and those not watered, as all trees did well.

ONIONS ON LAND PLOWED AND ON LAND ONLY HARROWED

Have received quite striking results in the cultivation of onions on land plowed as compared with those grown on land only harrowed, and always with a larger and better yield on land only harrowed. Full details of this experiment will be reported on later,

POTATOES AND BORDEAUX MIXTURE.

By using this mixture on the foliage of potatoes, the yield has been increased and the appearance of the tubers improved.

GERMINATOR OF CEREALS.

This is a compound which is sold to hasten the germination of all seeds, and which is said to prevent rust, smut, and mildew. We have found it worse than useless in repeated trials with corn, beans and wheat and think it of little, if any, value.

ASPARAGUS.

In cultivating this crop with roots planted ten inches deep, and roots three inches deep, there has been a very decided advantage in amount of profit in the bed with roots planted shallow. The land used was an open, clayey loam.

STACHYS TUBERIFORA.

This I received from London last Spring. It is a small plant

growing to the height of about sixteen inches, and producing small peculiar shaped tubers in abundance. The tubers are of good flavor, but rather too small in size to ever become popular. It is not at all allied to the Jerusalem artichokes, but is a near relation of our mints.

USE OF ARSENITES ON OUR NATIVE PLUMS TO DESTROY CURCULIO AND GONGER.

In our experiments trees of several kinds of native plums have been syringed with water containing one teaspoonful of London Purple, to three gallons of water. Alongside of these so treated, were left trees of the same varieties not treated. The result was at once apparent in the improved fruit of the treated varieties. This will be reported on more fully in bulletin No. 10.

ARBORETUM.

We think that this season a move will be made on the part of the farm committee of the board of regents to start this most valuable feature. I am sure that when once fairly started, the wisdom of the move will be so evident that there will be no opposition to its further extension.

REPORT FROM OWATONNA EXPERIMENT TREE STATION.

By E. H. S. Dartt, Superintendent.

The past season has been unfavorable to the growth of trees. The winter of 1888-9 set in after a very dry fall with very little rain or snow and the ground remained nearly bare so that wagons were used the entire winter with the exception of a few days towards spring. Though the winter was very mild yet root killing of young apple trees prevailed to a greater extent than it has for many years. One year old trees were most effected. As has been my custom the ground had been sown to oats the previous August but drouth retarded growth and cows got in and cropped off what did grow so that there was really no protection. About $\frac{1}{4}$ of the trees were killed. The most hardy varieties and the most tender suffered alike. A few Orange Crab seedlings were killed. In most cases enough of each kind has been left for experimental purposes. A very severe frost occurred May 30th, which killed nearly all the growth on young trees of Catalpa, Russian, Mulberry, Horse Chestnut, Black Walnut, White Ash, Douglass Spruce, Colorado Blue Spruce, Hemlock Spruce and Siberian Fir. The injury to Douglass and Colorado Blue was greatest destroying the season's growth and it may prove more permanent. Norway and white Spruce were slightly injured, whilst most other trees were unharmed.

Grapes were badly damaged many canes set with fruit were killed to the ground.

SEEDS.

Of seeds of Catalpa and Hop tree grown at Charles City, Iowa, and planted last spring not one grew. Seeds of Russian Apples planted in the fall of '88 germinated poorly, only about fifty having grown. From Thompson's seedlings there are a few more and a like number from other selected seeds. Seeds received mid-winter, soaked, put in moist saw dust and put out to freeze and planted in the spring grew better than those planted in the fall. I have hopes that many seeds that have lain dormant on account of drouth may come up next spring. Pomace from five or six bushels of Greenwood crabs has been planted. I have received a few apple seeds from Vermont and am promised another lot from Thompson's, Iowa, seedlings and a few from other sources. Seeds of Soft Maple, Box Elder, White Ash, Burr Oak, White Oak, Native Thorn, Butternut and Black Walnut have been planted. The Butternut succeeds much better than Black Walnut.

ROOT GRAFTS.

Eighteen hundred root grafts were set last spring comprising about seventy-five varieties of the most promising apples and crab apples that could be obtained. Geo. P. Pepper, of Wisconsin, contributed several varieties, some of which are crosses by hand fertilization. A good stand and average growth has been secured some of the most vigorous having made a growth of $2\frac{1}{2}$ feet. They were well cultivated to August 1st when oats were sown among them for winter protection. Preparations are now made for grafting about forty thousand the present winter. One hundred and fifty varieties of Scions are now on hand about fifty of which are Russian and one hundred of other varieties. As late acquisitions I may mention two new seedlings from A. J. Philips, of West Salem, Wisconsin, who contributed two 4 year trees of each kind from which an abundance of Scions have been taken. Bardwell & Haviland, of Fort Dodge, Iowa, have donated a pretty full list of Mr. Gideon's seedlings for trial. If these trees are of great value in Minnesota the original trees should be producing remunerative crops at Excelsior.

SEEDLING APPLES.

Many promising seedlings have been obtained from noted growers and experimenters scattered over the northwest, most of which present a fine appearance. From one hundred seedlings presented by Mr. Gideon and a like number of our own growing we have cut Scions from twenty of the best looking trees. Eight kinds were grafted last winter and twelve will be grafted this winter. These varieties are lettered from A to U. We have grown a few Duchess and Tetofsky Seedlings but more of the crabs. We have placed forty seedlings of the Greenwood Crab in nursery row for trial and one hundred of the Orange crab. We have now more than five hundred seedlings of the Orange crab and as many of other kinds. What shall I do with them? Shall we test the hardness and bearing qualities of all or shall we use most of them for stocks.

It seems evident to me that our crab list is susceptible of great improvement for there are few varieties against which serious objections cannot be raised. I mentioned in my last report that I have grafted twenty-seven varieties of seedlings grown from seeds of a seedling of the Tetofsky. These trees are now two years old. A few of them are reasonably smooth but most of them are so scrubby and thorny as to clearly indicate a crab origin. This may not seem so strange when it is known that Ingraham Gould first introduced the Tetofsky at Beaver Dam, Wisconsin, in the early 50's under the name of Russian Crab.

The testing of new seedlings as to productiveness and quality of fruit has been delayed for want of trees of suitable size for top grafting. To meet this want, of the one hundred and twenty trees placed in orchard last spring about one hundred were crabs and hybrids designed for this class of work. I have also cut Scions of Greenwood Crab for one thousand root grafts believing this variety to be unsurpassed as a stock on which to graft the more tender varieties.

RUSSIAN APPLES.

Of about two hundred varieties of Russian apples, mostly four years old, a few have been root killed a few others are not looking well but most of them are in a thriving condition and scions have been cut from the best for the present winter's grafting. Fearing that I did not have the hardiest among the Russians I requested Prof. Budd last spring to send me a dozen or more kinds of the hardiest he could select. He sent the following: 18M. 7M. 130M. 15M. 141M. 1M. 17M. 10M. 14M. 87M. 431 Dept. 190, 544, 596. Simbirsk and Antonovka.

If no test of hardiness is conclusive until a tree has attained bearing size and has produced exhausting crops, then the best thing for us to do while waiting is to sift out those varieties not likely to attain bearing size. Even this work cannot be done without the advent of very severe winters.

CHERRIES AND PEARS.

Five varieties each, of Russian Cherries and Pears have been planted. All are alive. The Cherries have made a satisfactory growth, considering the season, but the Pears have not.

PLUMS.

Four varieties have been added to the list and twenty-four trees have been placed in orchard. Of these the Speer, Owatonna, Miner and Early Red are No. 1 in vigor, Weaver No. 2, Black Prune, Rockford and White Nicholas No. 3 and Wolf and Garden are dead. The Rollingsstone root killed in nursery last winter. Over four quarts of selected plum pits have been planted.

RUSSIAN WILLOWS AND POPLARS

are all doing fairly well except *Populus fastigata* or *dilitata*, which killed to the ground last winter. New shoots have grown five or six feet. I have found this to be our worthless Lombardy poplar under the disguise of its scientific name. The following were

added to our list last spring: *Populus Boleanna*, *Populus Siberica*, *Populus Wobsky*, *Populus Bereolensis*, *P. Alba Angustea* and *Salix Fragilis*. The wood of the latter is said to be valuable, being light and tough and durable in moist situations.

FOREST AND ORNAMENTAL TREES AND SHRUBS.

Quite a number of trees of doubtful hardiness have been planted. Some have been placed on the north-east side of a snow fence four feet distant to try the effects of shade. As there is no dividing line between trees and shrubs I have concluded to cultivate a few varieties of such shrubs as will stand our winters without protection, and will pay especial attention to natives of Minnesota. The following were planted in spring of 1889: of arbovitae the *globosa*, *gigantea*, *orientalis*, *plicata*, *Siberica*; the stone pine, eastern spruce, Nordmans silver fir, Hooker's hemlock, Calabrian pine, red pine, white spruce, American yellow birch, black birch, American white birch, black walnut, wild black cherry, buckeye, Tea's weeping mulberry, hop-tree, Kentucky coffee tree, Norway maple, English maple, mountain maple, oak leaf mountain ash, European mountain ash, American mountain ash, American sycamore, tulip tree, cucumber tree, Japan cypress, American beech, horse chestnut, American rock elm, English elm, Scotch elm, American white elm, hawthorn, hornbeam, black thorn, dwarf Juneberry, privet, purple leaf Berberry, *Crataegus sanguinea* (thorn), wild cranberry from Wisconsin, bearberry, blackberry and bush blueberry from Wisconsin woods, *Artemisia abrotanum*, *Phox*, *Ribes* 148 var. (currant) *Eleagnus angustifolius*, high bush cranberry, *Rosa rugosa* (Japan rose), *Spirea*, *Philadelphus*, *Spirea Douglasii*, *Spirea Van Houttei*, *Spirea Derxii*, *Spirea rup* and *Spirea nobleanna*. I regret to state that some of these trees were inferior in size and quality, arrived in bad order and proved almost an entire failure. Most of them, however, are alive but have not made satisfactory growth. I trust that the mistake of buying very cheap trees will not be repeated.

I supposed that sweet chestnut trees grown from nuts would show leaves more than one season, but they didn't. Downing's Mulberry has gone with them. Weir's cut leaf maple is well started, only one sprout left.

Small trees of catalpa and Russian mulberry killed to the ground last winter but have sent up vigorous sprouts. Most catalpas six feet high are making some growth. The red cedars now growing on the Station, though said to have been grown from Northern seed, have not given satisfaction. Perhaps there was a mistake about the seed.

Of evergreen trees planted about the school grounds the balsam fir has died out worse than any other kinds, and I predict that in a few years from now the balsam fir, box elder and European alder will only be planted for the sake of variety; for the white spruce is much better than the balsam fir and the soft maple is better than the box elder. The one serious objection to the soft maple that it splits down in storms may be partially removed. If grown thickly in groves not many forks will form and lone trees may be pruned

according to the correct method of pruning apple trees (when pruned at all) with main center stems and moderately sized side branches. Or if a tree is trimmed up till three or four inches through and the top cut off eight or ten feet high it will form a round head by throwing out numerous long branches which are likely to whip around in the wind without being broken.

The greatest obstacle in the way of rapid progress thus far seems to have been the want of funds to purchase stock and make necessary improvements. Judging the future by the past the question arises, Shall we plant with a view of selling trees to help pay expenses? I have given this subject much thought, and am confirmed in the belief that no man who runs an experimental tree station at public expense should be engaged in selling trees.

The most reasonable way to dispose of the surplus would seem to be, first a liberal patronage of the brush pile, next the supplying of other stations with things likely to prove valuable, and lastly the supplying of nurserymen with things of established value to be propagated and sold at reasonable prices.

Though the incidental fund seems too small for the most efficient work, yet I am glad to state that the financial situation is better than it was a year ago. Then there was a deficiency, now there is none, and I shall hope by continued effort to merit your approval.

I renew my request that you immediately establish such a system of inspection and supervision over this station as will be a guarantee for its future usefulness.

REPORT OF EXPERIMENT STATION AT FARIBAULT.

By O. F. Brand, Superintendent.

For location and surroundings of this station see Report of 1888, Page 347. Of the two trees mentioned in that report budded on Beaches' Sweet in 1875, one of them since named Richland Beauty, blighted some the past summer, the other one is entirely free from blight and bears an apple very much like Janet. Quality poor.

The original is a seedling from Duchess; it is a good bearer in good condition and 23 years old next spring.

The Estelline, a seedling of mine now 11 years old is very promising. It bore a good crop in 1886. The fruit is nearly as large as Fameuse. Top of tree open and spreading. It is from seed of either Duchess or Palmer's Sweet Crab. I think from the latter. The wood shows no discoloration. I have named it Estelline. The Drake apple top worked on a seedling crab about 1873 is a fine tree and made a remarkable growth last summer. Three fourths of the top is south of the center of the trunk and shades the trunk and forks from the sun. Here are two important points which should be considered by all who plant apple trees in this climate, to wit: Hardy stocks and shade of trunk and forks from sun in winter from

2 to 3 o'clock. The Drake is of about the hardness of Haas, as a *root graft*. Fruit from this tree was shown at the last winter meeting. Owing to heavy freezing nights after apples set, there was no fruit here last summer.

PEERLESS.

We have several thousand of this variety top worked on Whitney No. 20, Transcendent, Duchess, Early Strawberry, Meader's Winter, and a number of other kinds of crabs. As a root graft it seems to root well from the scion, and it apparently so rules the stock as to impart hardness to it—more so than most other varieties. Last winter there was little or no snow to speak of, and there was a great deal of root killing among my yearling trees by the side of the Peerless. The Peerless, with but one exception, had been cut to within three or four inches of the ground, they being needed for scions. There was no root killing among them, but Whitney, Early Strawberry and Berry Crab were nearly all killed, and Transcendent, in the very next row, were partly killed. All were on the same kind of stocks. On the other side of the Peerless were Briar's Sweet Crab and Richland Beauty, one of the six old seedlings of Duchess, grown by Mr. J. G. Miller. There was no root killing among them, and on digging them last fall I found the Richland Beauty had rooted from the scion better than anything I had ever seen. This variety seems to be nearly a straight reproduction of the Duchess—fruit a little smaller, stem longer, and a few days later in ripening. There is in the old tree a more well defined tendency to blight than in the parent Duchess, which I take to be a pathological sequence of in and in breeding. This point in *development* is strongly shown by the PEERLESS, which being a cross between Talman Sweet and Duchess—the best representatives of two different types or families, shows no tendency whatever to blight. The Faribault, now two years old, makes one of the best of nursery trees. The original tree is supposed to be a seedling of Little Romanite, about twenty years old. Young trees grafted from it have been in bearing several years and are very productive. The old tree is on the school grounds of the Episcopalians here. The fruit keeps well all winter.

The past summer was the driest ever known here and the Aphis the worst ever known. Evergreens were injured by the late frosts in May and did not make as good a growth as usual. The Simmons crab was the only tree except plums that bore a crop here last year. It is the earliest crab known—small, yellow, but very good.

Of plums the BERRY was the most profitable last year.

RUSSIAN APPLES.

Of the three remaining varieties left from 65 varieties set in the spring of 1873, together with three from the planting of 1874, and 100 trees set in the spring of 1883, all have maintained their well merited reputation for general worthlessness in our climate.

YOUNG SEEDLINGS.

I have now set out in orchard rows about 30 seedlings from

Peerless, now three years old. I had about 75 Duchess seedlings from seeds saved in 1882. Some of them not looking well in spring of 1888 were grafted with Peerless. Owing to the well known tendency to reversion among seedlings I do not expect any great result from these, they not having been fertilized with anything that I know of. Last spring I added Talman Sweet and Roman Stem for experimental purposes. Where I have used evergreens to shade apple trees good results have been obtained. I most strongly recommend the planting of evergreens by every person who owns land.

REPORT FROM EXPERIMENT STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

MR. PRESIDENT AND GENTLEMEN OF THE STATE HORTICULTURAL SOCIETY: Taken as a whole the last season at La Crescent proved an unusually dry one, yet fruit crops as well as other crops have turned out very satisfactorily with the exception of strawberries. Strawberries were seriously injured by a late frost occurring after a portion of the fruit had set, and consequently in many localities were less than half a crop. With me the Crescent was the only variety that amounted to anything. The Jessie produced a few fine berries but not more than one eighth as many as the Crescent, Chas. Downing yielded about the same, Belmont still worse and Manchester and Lyons Seedling none at all. Raspberries were a large and splendid crop. The Ohio black cap and the Cuthbert red were the best. Marlboro did much better than it has heretofore. The blackberry crop was immense. The Ancient Briton is taking lead and the Wilson Junior does not promise to be worth retaining. Our grapes all ripened perfectly and all plants that were old enough fruited fairly well. We think that among the newer varieties the early Victor has considerable merit for locating where the Concord does not ripen perfectly. The Empire State at its first fruiting is not as good as we had expected. It may improve as the vines get older. The Brighton is doing well and I think will prove of great value as a market grape. The last year was a famous one for plums so far as quantity goes, but I do not think the quality was generally up to the average, owing to overbearing, extreme drouth and injury to the foliage by green lice or flies. The De Soto, Cheney, Rollingstone and Vermillion are the best varieties that have yet fruited with me. My trees of other select varieties are yet too young to fruit, but are doing well. In apples, we had the best crop of of Duchess we ever grew. Tetofsky also bore very well. It seemed to be an off year with the Wealthy but our trees made a fair growth and have gone into winter under promising conditions. The varieties of Russians received from the Minnesota state experiment station passed the winter of 1888-89 without apparent injury and most of them are looking pretty well at the present

time. Antonovka, Moscow, Nos. 61, 515, 599, 971 and one with number lost, look the most promising. Of the trees received from J. L. Budd a few years since, the Antonovka, Ostroff's Glass, Gypsy Girl and blushed Calville are doing the best. One of the Ostroff fruited, perfecting four specimens. I should not judge it to be an all winter fruit but in quality it is better than the red or yellow Anis. In the nursery I have set about 200 root grafts chiefly of seedlings and untested varieties. I am also conducting some experiments by budding upon two year old stocks near the surface of the ground with results which for the first season are very gratifying as a rule. The growth has been from two to four times as great as that of root grafts and seemingly the wood has ripened better. The varieties tried are H. J. Ludlow's seedlings Daisy and Wax, and Klem's seedling No. 1. Many of the buds made a stocky growth of five feet in length, the Daisy showing the strongest growth.

Three buds of the Daisy were inserted in the top of a three-year old transcendent crab, and one of them completed a growth of six feet and four inches the other two six feet each. Several other varieties of buds have been inserted this season to give the method further test. We should like very much to have parties who are growing good varieties of native plums, send us rooted sprouts of the same, or if they cannot send sprouts, send scions. If any varieties received should develop qualities making them worthy of general cultivation the owner or originators rights shall be respected and they shall not be propagated for sale without his permission.

REPORT FROM EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

Native plums of all kinds, were very abundant. Among the varieties that had not fruited before but fruited this year, were the Robinson, Forest Rose, Le Duc, Rockford, Cheney, Gaylords' Choice, two kinds from Mr. Luedloff and numerous seedlings.

Samples of fruit were received from Mr. Knudson, of Springfield, Mr. Heideman, of New Ulm and Mr. Terry, of Crescent City, Iowa. All of which were very fine, and give promise of being valuable additions to our list of plums.

Scions of these have also been received for testing and comparison with other kinds. By request of H. E. Van Deman U. S. Pomologist; several varieties of plums were sent to the department at Washington. In acknowledging the receipt, special mention was made of the desirable qualities of the Rollingsstone, and of Le Duc's as being among the best natives that had come to his notice.

Inquiries have been received from several experiment stations, in regard to the time of blossoming of different fruits.

The time varies so much according to the season, that observation for a series of years would be necessary, to be of any practical value. The following is the record at this station for 1889. On strawberries, first blossoms appeared on the Wilson May 8th, on Manchester, Jessie, Crescent, Downers, and others on May 12th. On blackberries and dewberries, Britain, Stones Hardy and Snyder and Lucretia and Windom blossoms were about alike on May 20th. Apples.—A few blossoms appeared on May 1st, on the Duchess, Fameuse, Wealthy and Utters Red; also on Transcendent, Hyslop, Strawberry and other crabs. They were all in full blossoms between the 1st and 7th of May. Of native plums. The Cheney was in blossom on April 25th, and other varieties ranged from three days to one week later.

EXPERIMENT STATION AT CARVER

By Chas. Luedloff Superintendent.

The Russian apples that I experiment with, have done well the past season. Some of them bloomed and some set fruit, but Mr. Jack Frost killed all the blossoms and little apples consequently they have all made a good growth without showing any signs of blight. In a short time I will have them tested. The apple crop was poor this year and only a few crabs bore fruit. The plum crop was good and brought a good price in market. I have some of the best native varieties and some Russian and tame plums. The two last named kinds do not stand our hard winters so I give them protection until they will come into bloom to get pollen for cross fertilization with my best native plums.

The grape vines were healthy, the crop was fine and all ripened. Of the new sorts I will mention the "El Dorado" as a very fine white sweet grape.

Strawberries. The crop was very poor on account of the dry weather, I picked only once over.

Blackberries. When in bloom they looked very promising and looked like a snow bank, they were so white but a hard frost killed the blossoms.

EXPERIMENT STATION AT CHOWAN.

By M. Pearce, Superintendent.

SEEDLING FRUIT TREES.

After the winter of 1872 and '73, when the fruit trees were about all killed in Minnesota, we made up our minds that if we ever got fruit trees to stand in Minnesota they must be grown from the seed of hardy varieties of apples that grew in the state. With

those views, though the prospect was far in the future, we went to work planting hardy seed, and looking the country over for hardy seedlings. We have of this class of trees three varieties that have gone through thirteen Minnesota winters without being injured. We will give a short description of those trees and their fruit.

THE VICTOR.

This grew from a seed of the Tetofsky, fertilized by the Duchess of Oldenburg. The tree resembles the Duchess in growth, bark and leaf; but is much more hardy than the Duchess; it has been tested over the Northwest and Canada, and so far as reported is standing well. It is a very heavy fruiter and requires a strong and rich soil to bring to perfection the unusual amount of fruit it sets. The fruit grows from spurs all along the branches the same as the Tetofsky; ripens about the first of September and will keep several weeks; of medium size, striped and sometimes red with yellow ground; of a very pleasant sub-acid quality for eating. Good judges at our numerous fairs say it is of the best. We have fruited this variety six years.

BONKRY,

An Indian word and signifies big. This is a true hybrid grown from the seed of a small cherry crab fertilized by the Duchess. The tree is as hardy as the Transcendent and has never blighted, and like the Victor has been well tested and stands wherever planted on good soil. The tree is a beautiful and rapid grower. Some of my three year old trees made a growth last season of nearly four feet. It fruits as heavy as the Transcendent, commencing at three and four years. The fruit is about as large as the Transcendent, and more flat than round; color a deep red or scarlet, handsome beyond description, very juicy, sub acid, with no crab quality. It will keep a month or longer after ripening. It comes into season just after the Transcendent is gone and fills a very important period when everybody wants crabapples and are ready to pay a good price. When this hybrid becomes well known, beyond doubt a great demand for the trees will arise.

ARCTIC.

From what seed this tree grew we do not know. The tree is ten years old. About 12 inches in diameter a foot above the ground; it sends out long branches three feet from the ground and has a large spreading open top about fourteen feet in diameter. It has every appearance of being perfectly sound and has borne a heavy crop of good apples for four years. Last season ten bushels of apples were picked from it. If this tree after producing such a tremendous crop, survives the winter and comes out healthy in the spring, we shall consider it the most valuable of all our apple trees. On this we will report in due time. We have several other seedlings that are hardy and do not injure, that have not fruited.

RUSSIANS.

We have what is considered the cream of those varieties. They appear to be perfectly hardy. Some have blighted. We have

fruited one Russian variety; we received the scions from which we got a start from a friend who was very much carried away with the tree and its fruit. We went to see the fruit and tree and were very much pleased with both. He informed me he had been sending to Washington for scions for several years and root grafting, and this was the only variety that would stand on his ground, which was not good for fruit. His tree when I visited it was well loaded with large flat striped apples of an excellent quality for cooking, and will keep about as long as the Wealthy. We have been propagating and growing these trees six years and have sent them out in other localities to be tested. So far as we have heard they are a success. From experiments we have made, we are satisfied it is useless to plant the seed of hybrids such as Whitney, Beech's Sweet, Powers Crab, Early Strawberry and Wealthy. We are now perfectly satisfied the Wealthy is a hybrid, probably grown from a cherry crab seed, fertilized by Jonathan or Fameuse, both of which it much resembles in quality. We say this and have the best evidence to sustain the assertion that the cherry crab seed, that has been fertilized by any good pure apple, will give much better results than any apple or crab seed that can be grown. Time will sustain me in this assertion.

EXPERIMENT STATION AT MOORHEAD.

By R. M. Probitfield, Superintendent.

I have made no reports since 1887, (see page 315, Vol 15.) for the reason that I had not enough of value to report to claim any of your valuable time or space in the Annual Report, nor do the results of my experiments since give this report much value. The springs and summer seasons in this locality for the years 1887, 1888 and 1889 have been unusually unfavorable to the growth of new made plantations on account of drouths, dry, and scorching high winds and untimely late frosts, besides millions of the measuring worms, devouring the foliage of orchards as well as forest trees in early summer of 1887, leaving all trees almost like in midwinter. In consequence, all my Transcendents, planted in 1873, from which I had about five very heavy crops, are all gone; they died en masse and I cut them all off in the fall of 1888, not one left to tell the tale. That a large share of the failures of Russians and other trees, received from A. W. Sias, A. G. Tuttle and Prof. J. L. Budd is due to the same cause I do not doubt, and in consequence it would not be fair to condemn all the varieties that failed, as being not hardy enough for this section of country. The trees left, are most of them not so tall as when planted, being a new growth from lower part of stem, and I now let them grow in bush form. The examination on which this report is based, dates from September 24th, 1889.

RECEIVED FROM A. W. SIAS, 13 TREES, PLANTED MAY 6 AND 7, 1886.

NAME OR NUMBER.	Dead.	Still Alive.	Doing Fair.	Doing Well.
985 Red Anis.....	1	.....	.....	.....
985 " ".....	1	.....	.....	.....
68 Early Champaign.....	1	.....	.....	.....
964 Autumn Streaked.....	1	.....	.....	.....
161 Longfield.....	.....	.....	1	.....
Summer Calville.....	1	.....	.....	.....
966 Red Balck Winter.....	.....	1	.....	.....
334 Yellow Transparent.....	.....	.....	1	.....
Mahone White.....	.....	.....	1	.....
382 Russian Green.....	.....	1	.....	.....
338 Revel Pear.....	1	.....	.....	.....
987 Yellow Anisette.....	.....	.....	1	.....
333 Red Transparent.....	1	.....	.....	.....
Total, 13.				

RECEIVED FROM A. G. TUTTLE, BARABOO, WIS. PLANTED MAY 6-7, 1886, 18 TREES

NAME OR NUMBER.	Dead.	Still Alive.	Doing Fair.	Doing Well.
2 Enormous.....	2	.....
2 Whitney No. 20.....	1	1
2 Hibernial.....	1	.....	.....	1
2 Arabian.....	1	1	.....
2 Green Streaked.....	1	1
2 Blue Anis.....	2	.....
2 Glass Winter.....	2	.....
2 Yellow Anis.....	2	.....
2 Long Arcade.....	2	.....
Total, 18.				

I did not receive the trees from Mr. Tuttle with any numbers, only with the names above given.

RECEIVED FROM PROF. J. L. BUDD, OF IOWA, PLANTED MAY 6 AND 7, 1886
25 TREES.

NAME OR NUMBER.	Dead.	Alive.	Fair.	Doing Well.
2 30 M.....	1	.....	1	.....
5 599 †.....	.....	.....	.....	5
5 984 †.....	1	4	.....	.....
3 200 *.....	1	1	1	.....
10 26 M.....	4	2	4	.....
Total 25.				

From the bulletin of the Iowa Agricultural College of date 1885, numbers with M stand for Morkan Importation; those with † are Department numbers of Washington; Those with a star *, Iowa College Importation.

RECEIVED FROM J. C. PLUMB, MILTON, WIS., 25 TREES, PLANTED MAY 8, 1887,
DONATED.

NAME OR NUMBER.	Dead.	Alive.	Fair.	Doing Well.
10 Red Lake Winter.....	6	.....	3	1
4 Homestead.....	1	.....	1	2
5 Lake Winter.....	2	.....	3	.....
4 Artic Crab.....	2	1	.....	1
2 Sweet Russet.....	1	.....	1	.....
Total, 25.				

Received from F. K. Phoenix & Son, Delavan, Wis., 10 trees on May 5, 1887, and planted on May 8th two of each: Yellow transparent, Quaker Boy, Isham Crab, Martha and Child's Crab. The larger part never started to grow and all died before September 1, except one Martha, which showed life still in 1888, but was dead in spring of 1889. It was not a fair trial. The trees looked dubious when received and must have been exposed during transportation. Messrs. Phoenix & Son kindly donated them to this station for trial.

Received from Chas. Luedlof, of Carver, (donated) 47 trees, all or nearly all Russians. 11 Plumtrees, 4 Osthine Cherries and a variety of grapevines, evergreens, Russian Acacia and Pæony on May 9, 1887, and planted same on May 10 and 11. I made an examination of same also on September 24, 1889, but have either mislaid or lost my notes and exceedingly regret that I cannot now make a satisfactory report on the lot on account of snow. It was a nice lot. Stating from memory, there are about 30 alive and 12 to 15 doing as well as could be expected considering the extremely unfavorable three seasons they passed through. The following are the names and numbers:

Isham Crab, 202; Hare Pipka, Krouse No. 2; Lady Crab, Ostrakoff, 472; Reichland Winter, Pres. Hayes, Duchess No. 3, Large Long White, 979; Oblong Crab, German Rambon, Gibb, Sweet Miron, 151; Red Teat, 975; Juicy Burr, 544; St. Peter, 372; Child's Crab, Lieby, 340; Grushezka, 519; Cinnamon Crab, 322; Charlamoff 262; Milton, Bogdanoff 3 grafts, Negeloff 980, Green Anisette, 986; Tiesenhausen, 190; Tolotoveff, 275; Wartzapple, 451. The four Ostheim cherry trees did remarkably well the season of 1887 but were badly trimmed off during winter 1887 to 1888, but nevertheless made a good growth in 1888 again, but froze down to roots during the mild winter 1888 to 1889. They sprouted out again during last summer and I wrapped them with gunnysacks early in November last to keep rabbits off and protect from cold. The plum trees are 2 Sweeney, 2 Rollingstone, 1 Weaver, 1 Luedloff's seedling, 2 Large Red Sweet, 2 De Sota, 1 Peppers premium. They have done remarkably well and seem perfectly hardy here, and but for the late frost last spring, should have fruited all of them. Even the wild plum of which we have numerous and large patches along Red River, has totally failed the last three years.

Received from Prof. Budd 10 Grapevines in 1886, Coe and Cottage; the last died during last summer; also grapes received from Mr. Leedloff in 1887, all died last summer except Early Champion.

Received from State Experimental Farm, May 19, 1887, and planted May 21, grapevines as follows: 18 Concord, 6 Pocklington, 7 Worden, 6 Ives' seedling, 6 Hartford Prolific, 6 Agawam, 6 Goethe, 6 Brighton, 6 Lindley, 6 mixed (no name). Concord, Agawam, Worden, Brighton, Goethe and mixed done best, Pocklington and Ives seedling poorest in growth. Have some of each left, in all about 50. The concord set fruit in 1888 and again, but more so in 1889 and late frosts killed them both years, even all the young growth from same year. I have worked hard and faithfully to attain success if work and care could do it and next season will decide their fate.

Received from State Experimental Farm and planted May 18, 1888, 19 Russian appletrees.

2 Unknown, label lost, 2 alive.

4 Antonovka, 1 fair, 3 alive.

1 Charlottenthaler, 1 alive.

1 Moscow, dead.

1 585 Tusoff's Winter, 1 alive.

1 367 Polosator, 1 alive.

1 149 Unknown, label lost, 1 alive.

1 971 Vasilist largest, 1 alive.

1 157 Juicy White, 1 dead.

1 214 Sadowskoe, 1 alive.

1 164 Heidorn, 1 alive.

1 371 German Scrute, 1 dead.

1 468 Pointed White, 1 alive.

1 375 Cinnamon Pine, 1 alive.

1 461 Rebvistoe, 1 alive.

I cannot here close on apple trees without stating my failures on Wealthy of which I bought 200 root grafts some 8 years ago. A large proportion grew fairly; and the snow lodging in the nursery rows, they wintered fairly. They made a good growth next year, but all above the snow line killed back the winter following. I set out the finest into the orchard and transplanted the balance near a bed of raspberries. Those in the orchard killed to the roots the first winter, and near the raspberries all above the snow line, leaving about three to five inches alive after the first winter. The raspberries encroached on the nursery row, and now for the last two winters the Wealthy has made a remarkable growth, being some two to three feet above the raspberries which I left undisturbed, and if the top wood comes out uninjured this spring shall hereafter protect the trunks of the Wealthy and other trees of doubtful hardiness which will, on account of the work devolving on me, limit me to a smaller number that I can take care of. I should wish to state here that my hopes are largely on the process of originating new varieties adapted to the Northwest, from apple seeds judiciously selected and planted in localities for which we aim to produce trees congenial to the climatic conditions. Mr. A. W. Sias kindly supplied me with some apple seed which I planted last spring, they came up finely and I counted at one time 93 seedlings, when the cut-worm commenced its ravages on them. Quite a number of seeds still kept coming up, but when the worm stopped its destruction there were just seventeen seedlings left, on which I kept a jealous eye, between hope and doubt. I should like to receive small quantities of seed, grown from different hardy

varieties, standing in proximity to other good varieties, for planting next spring. There is a fascination in this whole work that keeps pushing the lover of horticulture into much hard labor without ever thinking of a pecuniary compensation, and if it were not so, very little progress would ever be made on this line.

Received from State Experimental Farm some willow and poplar trees, also a number of grape vines, one of which grew. They were all dead when I received them I thought, but put them 24 hours into water and set in root-house and then planted. Willows and poplars the same, of which only four lived. They were well packed when received, but express companies seem to have no further interest in them than to collect charges thereon and deliver the *brush*.

Of small fruit I have of raspberries only, Turner's Red. They are hardy, but for reasons already stated have not fruited for three seasons. The wild red raspberry, of which the woods are full, failed for the same reason. Red and white Dutch currants bear abundantly every year without fail. Have also from Chas. Luedloff Long both Holland and Fay's prolific, but neither has fruited yet. Gooseberries and strawberries I abandoned. Will try strawberries again when I hear that Brother J. O. Barrett of Brown's Valley, has made a *paying* success. Blackberries and dewberries I have not had on trial. I have my hands as full now and more so than I should for my age, and from the pleasure I derive (which may pay me), I cannot pay hired assistance.

ROCHESTER EXPERIMENT STATION.

By A. W. Sias, Superintendent.

We have, at present, sixteen experiment stations, so called, some of which, like my own, can hardly be said to *exist*--except on paper! Some five or six of these stations gave us good reports a year ago. We are just now entering upon the great work before us, and how *vital*ly important, that we *start* right. After studying this subject, with more than my usual care, I came to the conclusion, viz: that I could not publish my *honest* convictions in regard to this station work, without "blowing cold" on my past record, to the detriment of my present stock in trade! Yet, I must do it, if I go to the poor house as a penalty! I am not such a mad crank that I can see no good in this work, or but what I can perceive that these stations were created to subserve some noble end. But if our superintendents aim to do the greatest *possible good*, in the shortest possible time, they will get right down to *bed rock*. *primitive Native Fruit amelioration!* And I am *most anxious* that this good work should begin at once, and be vigorously prosecuted along the whole line the coming spring, without taking time to *itemize*, my plan would be simply *this*, take every known native edible fruit, from the apple down to the creeping cranberry, into the experimental grounds, and

either improve them by "garden culture" or hybridization, or *both*. Plenty of men can be found to offer fancy prizes for the biggest cucumber, bean, pumpkin, or squash—but where is the noble philanthropist, awaiting a *suitable monument*, who shall offer the ready *stimulus*, which *alone* can make *possible*, the rapid prosecution of the work indicated above? The work of improving our native trees, shrubs, and flowers, should also be carried along with the improvement of fruits as far as practicable by our experimental stations. We have added several good things to our experiment station the past season, but we have already taken more of your time than we intended to, and must not worry your patience further.

EXPERIMENT STATION AT FARMINGTON.

By L. E. Day, Superintendent.

Mr. President and Members of the Horticultural Society:

As superintendent of the Farmington Experiment Station I have been requested to make a report to the society, I will try and do so although I have but little to report.

With the exception of a few apple scions sent by our secretary, Mr. Gibbs, the first year I was appointed, I have had nothing on trial, only as I set out fruit for my own use. I commenced to set an orchard in the year 1864, and some of the time I have had from two to three hundred trees, but of the standard trees but few remain, all are dead but Duchess and a few Wealthys that have sprouted from the original trees.

Of the crabs the Transcendent, Minnesota, Hutchinson Sweet, Briers, Sweet, Whitney No. 20, Maiden Blush, Powers Red and some others are doing well. I would suggest to the society that they appoint (in my place) Mr. James W. Pool as superintendent of the Farmington experiment station as he is setting out a great variety of fruits which will make his report of more value to the society.

SEEDLING AND NEW FRUITS.

By J. S. Harris, La Crescent.

Mr. President and Members of State Hort. Society.

My report will be very brief. As I did not feel that the finances of our society would warrant me in making extensive exploration and research, I have performed my duties as much as possible by correspondence, and have come to the conclusion that it is both a very unsatisfactory method to rely upon, and a waste of time and postage stamps. During the season of 1889, I made one trip to Excelsior and Wisconsin, one to Rochester, two through Houghton

County, visited Mr. Lord at Minnesota City, several times, and gardens of E Wilcox, near La Crosse, twice. At Excelsior I found the seedling orchards of Peter M. Gideon bearing so little fruit that nothing of certain value could be gleaned. A portion of the trees look hard and good, and some will undoubtedly produce valuable fruit. His Peach garden was the most interesting object presented to us. He has practically demonstrated that this fruit can be successfully grown here. His method of procedure is to set the trees on a mound or ridge in the center of the hole, directing the roots to the two sides of the row and allowing none in the direction of the row. At the approach of winter the trees are laid down and covered. To lay them down a portion of the earth is removed from over the roots, and the tree bent to the ground and fastened there, then earth is thrown back over the roots, but none on the trunk and branches, and the tree securely covered with straw or corn fodder. Each spring the trees are uncovered and righted up. By this method the roots are not injured, or but slightly so, and the fruit he raises is much better than that usually found in our markets. At Waconia we gave the orchard and experiment grounds of Andrew Peterson a pretty thorough examination. There was but little fruit upon his trees this year. Mr. Peterson is testing the efficacy of thorough cultivation. After looking over the orchard, we find his best and most promising apple trees are about as follows:

- No. 3 m Lead about perfect.
- “ 4 m Ostrakoff Glass, good.
- “ 14 m Anisim, “
- “ 28 m Kluevskoe, “
- Green Sweet, “
- Red Repka, “
- Hibernal & Leiby “
- Plikanoff, “
- Christmas apple, looking very well.

We should judge all of the above to equal the Duchess in hardiness. One variety from Sweden, and one *variety of seedling* promises value for favorable locations. He has several varieties of plums in fruit. The Harriet plum and Cherry, were about ripe and very fine. It was rather an off year for fruit at Rochester, and about the best seen were two comparatively new hybrids, viz: Gideon, No. 6 and Sweet Russett. Both seem to be worthy of trial. The Gideon No. 6 was nearly as large as Fameuse, of fine form, a beautiful red color, good quality. The Sweet Russet is the largest and best sweet crab I have yet seen. The seedling apple trees heretofore noted in Houston Co., are still looking promising. We found one old tree at Brownsville, that had stood the winters of 30 years, and is still in fair condition and bearing fruit, said to be a fair keeper. Mr. Wilcox, of La Crosse, has for many years been collecting buds and scions of seedlings and new varieties that are reported hardy, and top working them upon crabs in his orchard; some have failed from want of congeniality, but a few have made a perfect union and are doing well. There are two or three varie-

ties that are worthy of being looked after and given further trial. He is unable to tell where they come from. The original trees may be dead and yet not have died from lack of hardiness, for thousands of trees perish on our farms through carelessness or neglect. A description of two of the varieties is herewith submitted. It is my opinion that this committee had best be continued, and that each member of the committee should be appointed for a defined district of which he should have an oversight, and that whenever anything promising is found, trees, plants, cuttings or scions, should be secured and distributed among our experiment stations.

REPORT OF SEEDLING FRUIT COMMISSION.

A. W. Sias, of Rochester.

This is the fourth annual report that your kindness has suffered to be inflicted. If we rightly understand, the main object the society had in view in creating this commission, it was in view of the sooner solving our difficult problem of the coming Winter apple, and not to help nurserymen (although two thirds of the commission belong to the fraternity) to hoist their half tested pets into undue prominence. Your committee frequently errs in judgment like the majority of mortals, but their motto has always been, and lived up to as far as possible, viz; "Be sure you are right and then go ahead." This we have tried to do without fear or favor. I have no doubt the venerable Col. John H Stevens had this grand old motto in mind, and well digested when he made the motion to take up the work of this committee. Such men as John S. Harris and G W Fuller never canvass this state without finding something worthy the notice of the society, and they are too well informed to be easily imposed upon by interested parties—men who hold the truth to be more precious than the society's money! And if the society should decide at this session, that we had been given sufficient time and money to bring out the "coming apple" for Minnesota in all its beauty and perfection, and if we did not do so we must "step down and out," we should step down very gracefully, thanking the society for past favors at the same time. In looking over the state for the "coming winter apple" your committee is obliged to state, that we find but little that is strictly winter, except the native crab apple, which so far as we have observed, is all winter. And I will state right here, on my own responsibility and without fear of successful contradiction, that when you find the ideal "winter apple" with perfect adaptation to this arid clime, and where the extreme heat is so trying on all vegetation at certain times the tree bearing this fruit will in my humble opinion, carry blood in all its veins peculiar to that species known to botanists as *Pyrus Coronaria*. Dame Nature placed this winter fruit all over the Northwest to supply her children with

a bountiful supply of choice fruit! I feel confident that my worthy colleagues will bear me out in this new departure that has been forced upon us, since we began to take observations over the windy prairies of Minnesota, in search of an honest winter apple. It looks as clear to us now that the native wild crab apple of Minnesota, crossed with the best of the Russians, or developed by garden culture, will in the not very distant future become our best winter fruit, as clear I say as it does that our native plum will surpass the eastern type. When we consider what a deep interest Col. John H. Stevens, the founder of this system of committee work, has taken in the "wild fruits of Minnesota," and how confidently he alluded to their hybridization in his report a year ago, we have no fears but that he will rejoice to see this line of work enlarged, and pushed with both brains and cash! The *P. coronaria* is in my humble opinion one of the most difficult wild fruits we have to hybridize. I am not aware that Dame Nature ever classed it with anything. It was on or about the first day of December last that I became fully persuaded that we could never develop the *Pyrus Malus* or *P. Baccata* into a satisfactory winter apple for this climate, and while the chances for a winter apple from the Russians were more promising than the other species just named, I am confident in my own mind that an infusion of our native wild crab blood, will greatly enhance its value for Minnesota. After arriving at this conclusion I looked about to see if I could find any instance where a cross had been made. I found none in this state, but happened to think of my friend Mr. C. G. Patten, of Charles City, Ia., who had called my attention to a hybrid of his over a year ago, but it did not impress me favorably at the time and I soon forgot it. I wrote him in regard to it and he sent me a specimen of the fruit just in time to exhibit it at our last meeting at Rochester, Jan 7th. I mention this to show that it has been done. In one cross Mr. Patten got rid of the greater part of the acidity and much of the bitterness. Reasonable inducements should be given in my opinion, for each superintendent of our experimental stations to begin this work the coming spring, Commence on this solid basis at the foot of the ladder and "breed up". It will take time, and as "a half loaf is better than no bread" we must plant the best sorts now available, for immediate wants.

On or about June 10th last, I received a letter from our chairman, asking me to go to Mr. J. C. Kramer's farm, near La Crescent, and look into the merits of his seedling strawberry, known as the Princess, (and so named by this society). Your committee labor under a disadvantage here, as they can only tell you how it behaves at home. Mr. Kramer informed us that it was started from seed seven years ago, and that he had never parted with a plant, except to his brother at Dubuque, Ia., and less than a dozen plants to him. I immediately wrote his brother, (enclosing a stamped envelope addressed to myself,) asking him how it succeeded there, but I never heard from him. Now, Mr. President and fellow members, if your committee has gleaned anything *really valuable*, in his long search for new fruits in Minnesota, it is *this*: if we would guard

against fraud and deception, and steer clear of much loss and disappointment, we must go slow on new varieties that have never yet left their mother nurse! Many of them will prove to be like the big boy that left home for the first time—he was *too green* for anything! But these reflections will not bar me from giving an honest account of how this new candidate for high honors behaves about home. Mr. Kramer has worked hard to give the country a better strawberry, and if it *should* behave as well all over the state as with him, it will, in my opinion, prove an acquisition. The Princess is, in many respects, a wonderful production. Its leaves average larger than any other strawberry plant we have any knowledge of, and the same can be said of the size of the fruit. And it is doubtful if we ever saw another plant carrying such a uniformly heavy crop. Neither have we seen any strawberry, except the native wild sorts, that were so sweet. Would suppose it to be a trifle earlier than the Crescent Seedling, but not so good a shipper. It has a peculiar habit of ripening a large number of berries at one time. H. J. Ludlow, of Worthington, the owner of those promising seedlings, Okabena, Daisy, and Wax, wrote us under date of Aug. 9th, 1889, informing us that a wind storm passed over his place, destroying his whole apple crop, amounting to some \$400. This accounts for our seeing none of these choice seedlings at our fairs, last fall, that attracted such favorable notice the fall before.

We did not have an opportunity to visit the Brett Seedlings, Houston's Peerless, and many others that we should have been pleased to see, but hope Mr. Fuller will report on some of them. David St. John, of Sumner, Fillmore county, has a seedling apple that is very hardy, and a good bearer, fruit about the size of the Gen. Grant, when seen in its best condition, better in quality, nearly sweet, a fine baking hybrid, and fair to good to eat from hand. The Beach's Sweet, that originated in this county, (Fillmore), although not what we now term a new sort, is worthy of a passing notice. Our old friend, Sidney Corp, of Hammond, Minn., showed us a fine tree, that he said bore over fifteen bushels the past fall, and the fruit is valuable. John H. Vandervort, of Mankato, showed us two or three varieties of hybrids that he obtained from F. K. Phoenix, that were fine; he did not know the names.

Mr. John Bamber who grew 200 splendid strawberry plants from one berry of the Jessie, had considerable bloom the past season, but had the whole crop cut off by the frost. Other parties about Rochester fared in the same way. We found the seedling strawberry of Wm. Lyon, of Minneapolis, doing finely at La Crescent, on the experimental grounds of J. S. Harris. Mr. Fuller and self visited Mankato August 27, 1889. And the plant seen there, that made the most favorable and lasting impression on my mind was the Kentucky coffee tree (*Gymnocladus*). Dr. Gray says *G. Canadensis*. The only species, a fine ornamental and timber tree, wild from West New York State and especially west with rough bark, twice pinnate leaves 2 or 3' long, each partial leafstalk bearing 7 to 13 ovate and stalked leaflets, except the lowest pair, which are single leaflets (2 to 3' long) the leaflets remarkable for hanging

edgewise. Flowers in early summer; ripening in late autumn, the large and indurated pod 5' to 10 long and $1\frac{1}{2}$ to 2 wide; the seeds over $\frac{1}{2}$ ' across. Several of these beautiful native trees still stand in different parts of the city, and many on the banks of the Minnesota river close by. Nature provided this fine ornamental tree with *thick rough bark*, preparatory to high pruning! And let me caution my friends in this connection, never to prune high unless your plant is provided by nature with a rough bark, or a very thick one. One of the most enthusiastic gardeners we found at Mankato for his age, was A. P. Shigler; he has a large variety of plums and and many other things. He is also quite a bee man. We noticed a fine plant of Yucca in his yard also.

August 25th Mr. Fuller and self visited the grounds and greenhouse connected with the second Insane Asylum at Rochester. Here we saw an extensive collection of trees, flowers, and greenhouse plants but what attracted my notice most was a large banana, carrying full sized fruit, but as we ascertained this was not a Minnesota seedling; we will reserve the description of it for our district report. From here we pass on to the farm of John Adler, in Haverhill township, where we find some large fine Russian apples, and hybrids. This township in our opinion (though backward now) will ere long be noted for its fine fruits. It joins the corporation of Rochester, hence handy to market. The townships of Haverhill, Viola and Quincy lie side by side on a high ridge of beautiful land already somewhat noted for what it has accomplished in the line of choice fruit.

We next bring up at the splendid farm of Wendel Vine, one of your whole-souled intelligent farmers who never allows, a "white man" to leave his place hungry, so we had to feed here. I think there is but little in a name *anyhow!* for Mr. Vine had more apples on his place than vines. He had an old wealthy tree hanging so full and looking so robust that I was in hopes we should get a word of praise for it, from our old stoical friend Fuller, who gazed in astonishment upon it at the same time I did, but I suspect he feared the heart might be *ebony colored*, but your stupid scribe thought it would make a most excellent frontispiece to our next annual report. We next bring up at the residence of Wm. Somerville in the township of Viola. Mr. Somerville needs no introduction to the older members of this society, he has long been known as one of the foremost pomologists of our state. Unfortunately Mr. Somerville happened to be away from home at the time of our call, so we took but a hasty look over the orchard and left for Rochester. But we saw enough (at least I did) to satisfy us that Mr. Somerville was making apple culture pay. His awards on apples at the state fair and southern Minnesota fairs was about \$150, last fall.

NATIVE PLUMS.

Your committee place no native fruit ahead of this except the *native apple*. We found a new variety in Fillmore county that I am inclined to believe to be a hybrid, it is so distinct from the

ordinary wild type. It is nearly as dark as the blue damson, and with dry rich pulp, and very much like the Rockford of Iowa.

One of the best varieties exhibited at our fair the past season, was the Quaker, it is an honest plum and bears an honest name. In our search through Fillmore county we name as best the Leonard, and the Moon plum. J. H. Vandervort showed us several good varieties at Mankato. Our native plum has stepped out of the old ruts, assumed a new type, and we may now reasonably look for something rich in the near future. We also called on our friend E. H. S. Dartt. We found here some very fine plums, notably the Harrison Peach and a fine seedling by Mr. Dartt. We were surprised to find in the hyperborean region of Owatonna, the Ohio Buckeye, *aesculus glabra*, and horse chestnut in bearing. We took a look over the Experimental Station, and were well pleased with the orderly manner in which we found everything. The new seedlings are looking well, considering the drouth they had to endure.

REPORT OF COMMITTEE ON SEEDLING FRUITS.

B. W. Fuller, Litchfield.

I had two objects in view this year in my short trip around the state, one was to correct any wrong impression made last year in regard to seedlings, and the other to learn something in regard to the real condition of apple growing in the state.

I visited Rochester and vicinity, Chatfield, Owatonna, Mankato, Faribault and Minnetonka and did what I could by enquiries and correspondence. I could hear of no new seedlings and my impressions of last year were confirmed regarding those then reported. I will not give a detail of my visits; only results. Mr. Dartt can exhibit a good many failures, and his successes are yet in the future. I examined Mr. Brand's seedlings at Faribault. The oldest I saw are only three years from the graft. They look as well as the Duchess, but I obtained no evidence that they were any hardier. Mr. Brand has a fine orchard of Duchess.

I was pleased with some seedling trees on Mr. Pearce's grounds at Lake Minnetonka. He has three varieties. One the Victor, "the original stood twelve years, and was killed by rabbits," apple, large as Fameuse and took the premium at Mr. King's fair, bears at six years. Another is the Lorska, a hybrid from the cherry crab and the Duchess. The third is—the Unknown—large, fine and keeps as well as the Wealthy. Bears at five years. Such are the statements given by Mr. Pearce.

The trees were five years old, I believe, and all in perfect condition, not an indication in body or limb of any defective wood. I have never seen trees in finer condition. The only thing to detract from this commendation is the fact that on the same grounds are

some Wealthies looking nearly as well. Regarding the Mills and Baldwin seedlings on my grounds in Litchfield, I have nothing encouraging to report. The original Baldwin, eighteen years old, is still sound and bearing full crops. And some trees budded on Transcendents five years old, are sound; but most of those root grafted have failed. The Mills, evidently belongs to the Wealthy class in hardiness. I can only report my conclusion of last year, that we have no seedling apple in the state yet proven sufficiently hardy to be trusted, only to be further tried.

In regard to my second object of enquiry, not perhaps legitimately included in the work of our committee, the present condition of apple growing in the state, I was sorry to find it so discouraging. I was told by a gentleman in Mankato, a gardiner and fruit grower, that he had tried a great many years to raise apples, but had not succeeded and had given it up. It was no use, and he said this was the general state of things in that section. This was confirmed by others. Some Duchess are grown about Minneapolis and along the river, though the two thousand Duchess orchard at Lake City has failed, and in the southeast corner of the state some Russians, just about enough to take premiums at fairs; and in all parts of the state, there are points where the Transcendent and perhaps two or three other crabs, still do well. But one need only recall the exhibit tables at our winter meetings or read our annual reports of premiums and lists of apples recommended for cultivation to be convinced that apple growing has made no advancement, to say the least, in our state for a good many years.

Is it not well to admit the true state of the case and strive for a remedy? It is evident some seedlings are hardy, when standing in their original place, but will not bear grafting. And none should be declared hardy until tried in this way. And then is not grafting as usually practiced, an unsafe way to propagate trees? Can any better way be discovered? Does budding produce any different result?

REPORT FROM WABASHA COUNTY.

By Sidney Corp, Hammond.

The last year was a fairly good year for fruit with us, but few trees died and there was not much blight. I am still very much pleased with the McMahon White Apple; the tree seems perfectly hardy with me, and the fruit, Oh! what apples. Think of apples loading a tree down, lots of them measuring over a foot and some of them thirteen and a quarter inches in circumference. I will send a few specimens for your examination at winter meeting. I also think well of Beach's Sweet Hybrid; I gathered from one tree this season fifteen bushels of good marketable fruit; the tree

has been planted out about twenty years and is one of the very best trees in my orchard, and there is the Autumn Streaked and the Anis; I find them both very hardy, but the former blights pretty badly at my place, and the latter has borne but little fruit yet, although they have been planted ten years. The fruit is a little under size and falls off the tree pretty badly, yet I think they are both good trees to plant as they are sure to stay by us.

Two or three years ago I got a fruit catalogue from E. Z. Teas, of Dunreith, Ind., and in it I saw a fine cut of a berry that had a new name to me, it was called Service Berry and described as being a half an inch in diameter and a fine thing generally, so I ordered a small lot and a few of Windham's Industry Gooseberries, and some of Lee's Prolific Black Currents. I planted them all out and the first winter killed all the gooseberries, root and top, and the next spring the Service Berry bore a few berries, and behold they were the same little dwarf June Berry that grew all over the grub prairies here before we broke it up. The currents bore well this season but I cannot say whether they are any better than the Black Naples or not.

REPORT FROM FILLMORE COUNTY.

D. K. Michener, Superintendent.

The apple is the only kind of fruit of any mention raised near here. Mr. Moon, of Spring Valley, can tell you more about small fruits than I could. The Duchess is the main reliance. Several hundred barrels were shipped from Spring Valley the past season. The Tetofsky, equally hardy, though not so many planted.

Of crabs the Hyslop and Transcendent are in the lead—a great many shipped west every season. There are a great many other varieties of crabs raised, though not in quantities to ship. Since the winter of 1884–85 only those varieties that passed all right are being planted, namely, the Duchess and Tetofsky and the Wealthy, on a small scale, though I still have considerable faith in the Wealthy. Varieties of crabs planted now, are Hyslop, Whitney No 20, Strawberry, Minnesota, Beech's Sweet, &c., &c. I manage to have Wealthy apples to sell every year at a good price.

I could have shown you the past season of my own raising Fameuse, Sweet Pear, Haas, Utter's Red, Malinda, &c., but would not recommend them, unless it is the Malinda. It stands the winter better than the Wealthy, and the apple can be kept until spring and then they are scarce and high. I only speak for this particular location. We keep raising seedlings, and think it will be the native seedling that will produce the winter apple of the future; are fruiting some that are very good. I have never gone into the Russian apple planting business. There are but few trying them about here.

REPORT FROM HOUSTON COUNTY.

By J. C. Kramer, La Crescent.

General gardening has not been good as an investment. There is so much small truck raised that prices are very low, and it does not pay to handle it.

Pickles and cucumbers are very scarce. It being a bad season they did not pay for the time put on them.

Tomatoes have done better as a general thing. I have delivered at La Crescent Pickle Factory, 250 bushels at 25 cts per bushel.

Grapes did poorly. The fruit did not ripen at all last autumn, but the wood ripened for next year.

Asparagus has done very well but at present prices it does not pay to raise it.

Beets were an entire success. I have at present in my cellar 100 bushels of nice table beets, in good condition.

Strawberries, in general, were a failure. We had such a heavy frost while the plants were in bloom that most of them were killed. I had one variety which stood the weather, viz: the Early Princess. I started this variety from seed planted in 1831. It grew without cultivation until 1837, when, it having fruited six seasons, I perceived some good qualities. I transplanted a few plants in a cultivated patch of ground and took good care of them. In 1837-8, when all other kinds were killed, Early Princess held its bright green color and came out in excellent condition, yielding such a crop as was never heard of before. I marked out a bed 5 feet wide by 2 rods long and picked 61 quarts first picking, 25 the second and 14 the third. By actual count a quart measure contained just eighteen berries.

Apples. I have no apple trees in full bearing condition except the Duchess. But I shall experiment until I find something which will suit me. I have three seedlings of which I will send one specimen of fruit by Mr. Harris. It is something new and has stood the cold winters first class. A year ago last spring the tree came into bloom but the blossoms fell off. Last spring it bloomed again and last fall bore two apples. I wish the committee would decide as to the quality of the fruit. The tree is a picture of beauty and, if a success, I will call it "The Picture of Beauty."

REPORT FROM MEEKER COUNTY.

By G. W. Fuller, Litchfield.

The late frosts of last Spring destroyed most of our small fruit. This is the first time within my knowledge that such a thing has occurred here. Strawberries and raspberries were in full blossom

and currants were well formed, when they were not only frosted but frozen. This together with the extreme drouth following made strawberries nearly an entire failure. Raspberries blossomed again, so we had about one-fourth of a crop of raspberries, as well as gooseberries and currants. In a few places, raspberries escaped and also grapes. On Lake Minnie Bell, Capt. Montford had a fine crop of grapes.

The only apples grown to amount to anything, were the Transcendents. One man in the northern part of Meeker county, sold nearly one hundred bushels. His orchard is in the timber and was set about twenty years ago; other varieties set at the same time, were Hyslop, Duchess and some others, but all have failed.

REPORT FROM MURRAY COUNTY, MINN.

M. F. Norwood. Balaton.

The year 1889 was a very dry season in Murray county, as has been the case the last three years, and fruits were not up to the average in this vicinity.

Of apples, crabs are the only ones in bearing and the Transcendent has been considered the hardiest, and in 1887 and 1888 they bore heavy crops, but in '88 they showed signs of blight and in '89 they blighted to such an extent as to seriously affect the crop, which was next to nothing. This blight may be accounted for by the orchard being located on the sunny side of a dense grove of large cottonwood trees, with also one row close by on east, south and west. Two years ago, we received 17 Russian apple trees; these were from Minnesota Experiment Station; I planted them in another place. They seem to be hardy, do not winter kill and have made a growth of from 12 to 18 inches each summer. They have been cultivated and kept clean the same as if in a corn field.

Of raspberries we have the Turner, Gregg and Cuthbert and also some natives. In productiveness the Turner is the best and is hardier even than the native. The crop and size of berries of all these have been affected to some extent by the drouth the past two seasons. Currants and gooseberries do not seem to mind the drouth much and have yielded a good crop. Strawberries were poor in old or grass bound beds, but a patch set out in 1888 and kept thoroughly clean yielded a large crop of delicious berries but did not continue in bearing as long as usual.

Grapes, of which we have mostly Concords, star'ed out for an immense crop but the continued drouth caused some of the fruit to shrink and be of poorer quality.

We mulch heavily with coarse manure or old hay and find it of great value in dry seasons especially for small fruits.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

Mr. Chairman and Members of the State Horticultural Society.

My report is rather limited. As to the interest of horticulture in Ramsey, Washington and Dakota counties, I find that it is not dying out. The prices that the farmers received in St. Paul, in *fall* of 1889, for their surplus crab apples, especially Transcendents and Hyslops, were remarkably good, ranging from \$1.25 to \$1.75 per bushel. Not long since when I called upon a German farmer he stated to me that he sold Hyslops for \$2.00 per bushel. Another gardener friend of mine told me that he made one hundred and fifty dollars speculating in the Transcendent and Hyslop, buying of the farmers and selling them at an advanced price in St. Paul market. I noticed those that had crab apples to sell realized more clear profit from them than from other products of their farms. This has consequently encouraged a good many to add to their orchard or replace dead trees. One German farmer showed me a tree that he had picked nine dollars worth of fruit from and marketed. Some still buy a few Duchess and Wealthy, notwithstanding the injury they received some four years ago. Farmers are becoming educated to the idea that if they would have an orchard to profit from they must needs buy young trees to take the place of the old ones as they drop out. Early Strawberry and Whitney's No. 20 are varieties that are purchased to quite an extent. I find that the Virginia crab gives satisfaction as to hardiness of tree and productiveness. If we could only get some standard apple (winter keeper), perfectly hardy, I think the farmers could be induced to plant it. But very few know anything about the Russians. The De Soto and Miner plums still remain popular with planters. (Planted in groups they produce well.) Grapes in some localities were an average crop. Raspberries in some locations were a pretty good crop. Strawberries a total failure, you might say, owing to the succession of frosts in the spring. Some of the strawberry growers are starting out on a few Jessies, though the Wilson takes the lead for a shipping berry. Currants and gooseberries are planted to more or less extent. The depression of the times, and the low prices that the farmer has to take for his produce, prevents his buying many trees at present.

Shade trees, sold principally in St. Paul, are soft maple, elm box alder, occasionally some basswood and hard maple, a sprinkling of evergreens and mountain ash. We still hope that we as horticulturists in Minnesota may continue to progress by developing varieties of fruit that may prove a source of remunerative income to the grower.

REPORT FROM WINONA COUNTY.

By O. M. Lord.

STRAWBERRIES.

Only the late blossoms produced fruit. The earlier ones were destroyed by severe frost. The market was however fairly supplied and good prices were maintained.

RASPBERRIES.

There was a good crop of raspberries, of both black and red kinds. Blackberries were abundant and prices were unusually low.

Grapes were almost a failure, from frost in the Spring and not more than one-fourth of an average crop was realized.

APPLES.

Except the Duchess, there were no standard apples offered in the market. A few others were produced here and there, mostly from young trees just coming into bearing. The market was overstocked with crab apples; especially with Transcendents.

REPORT FROM CARVER COUNTY.

By Andrew Peterson, of Waconia.

I have been hunting up the seedling apple trees in Carver county and examining them. Mr. Krause in Watertown, has thirteen varieties of seedlings. The trees are from fifteen to twenty-five years old and seem very hardy. The seed he got from Germany. There is more or less crab in the trees, so the fruit is small; some are the size of Transcendent and some larger. Some are red in color and very nice and most of them have a good flavor. Four of the varieties are entirely blight proof. A couple of them have blighted a little, but the reason is that they are standing close to a large building on the south side. Most of the fruit keeps until Christmas.

It seems to me that these seedlings ought to be planted in Minnesota instead of the Transcendent. I think the society ought to send out a committee next fall to examine the trees when the fruit is ripe.

I thought I should hunt up Mr. Koll in Young America township, but got sick and so could not. I heard lately that the seedling trees there are not very hardy. When I get well I will go and examine them.

Lately I have heard of seedling trees on the shore of Lake Minnetonka in the vicinity of La Fayette Hotel. The trees are

said to be perfectly hardy with large good fruit that keeps until midwinter. I have not yet found out the name of the owner of the trees, but when I get well I shall go there.

There are two other seedling trees in Carver county, one on my place and one at Carver, but as the trees are not hardier than Wealthy, there is no need to say anything about them. The fruit is good and keeps till March.

The trees on my place did not have much fruit this summer. We had two heavy storms that shook them off, and, besides, the year before they blighted so much that they could not bear well this year. This year they blighted very little because I had the trees topped? If I should call any of the Russians blight proof, it would be the Christmas apple. The tree is now sixteen years old and has never blighted. I can't bring any fruit to the annual meeting for exhibition as we have used it. The new Russian varieties I cut and planted the seed.

REPORT FROM FILLMORE COUNTY.

By Clarence Wedge, Albert Lea.

The past season has been one of extreme drouth. Strawberries were quite generally destroyed by a late frost. Raspberries and blackberries after setting a very promising crop, dried up and failed completely. Grapes of the common varieties although having a smaller berry than usual, bore an excellent crop. The Plums, De Soto and Forest Garden, bore heavily, although not quite up to their usual standard of quality. Apples were the lightest crop in many years.

Of the strawberries we have succeeded best with the Wilson and Crescent. Of the raspberries we shall dig up the black caps as unprofitable. Three years of careful culture, including winter protection, without any return, being as we think a sufficient trial. Of the red raspberries, the Turner, Cuthbert, and Philadelphia are good. We prefer the first as it is the best in flavor, yields bountifully, and requires no winter protection. Of the blackberries the Ancient Briton is good and the Snyder excellent.

Grapes are our favorite fruit. Their strong point being the certainty with which they produce a crop. We have growing and are succeeding well with Moores Early, Worden, Lindley, Delaware, Cottage, Agawam and Lady. Have discarded Prentiss and Telegraph and the quality of the Champion and Clinton, is so poor that we would not use them, were we planting a new vineyard. The Concord should be dropped from our list. In most years it comes to our home market in a green condition, fit only for jelly and sauce, and is making a bad reputation for Minnesota grapes. By planting such varieties as Moore's Early, Delaware, Lady, and Lindley, we can fully supply our home market with the best grapes in the world. The Lindley, is nearly as late as the Concord, but it is a

noble red grape of first quality and can be sold at 8 cts. per lb., and when dead ripe can be kept until January with little trouble. The Worden is a few days earlier than the Concord, over which it is a great improvement, but it is still some days too late.

One of the most satisfactory fruits that we raise is the plum. Its hardiness, health and productiveness with very indifferent care and the excellent quality of the improved varieties should commend it to every farmer. In "business like" qualities it much resembles the currant. The De Soto is perhaps the best of the well known varieties; we have also the Forest Garden, which, being some two weeks earlier serves to prolong the season.

In the years 1885 and 1887 we set some of the following varieties of Russian apples procured from Prof. Budd, of Iowa, A. G. Tuttle, of Wisconsin, and Chas. Luedloff, of this state, Nos. 282, 206, 4m, 284, 252, 984, Antonovka, Charlamoff, White Transparent, Longfield, Blue Anis, Vargul, Barloff, Hibernial and Repka Malenka. In this short trial No. 282, Hibernial, Lieby, Charlamoff, Long Arcade and Blue Anis have behaved perfectly. Barloff has blighted some, 206 sun scalds and appears not quite healthy. Antonovka has been killed by patches of dead bark girdling the tree below the snow line. Longfield, Repka Malenka, and White Transparent are far from hardy. 284 early died of blight. But little can be decided from this short experiment. The Wealthy as a young tree was as hardy and healthy as the best of these Russians. We have been somewhat disappointed in this trial of Russians. Coming from so cold and exposed a climate we had reason to hope that they would be well adapted to our state and that at least before they had borne fruit they would nearly all stand well our severe winters, but not one of them can as yet be considered safe to plant largely as a business venture. The Duchess with us is a perfect success, and the Wealthy, although a short lived tree, bears so abundantly in its youth and is such an excellent apple that if planted something after the following plan it might be a good tree for the home orchard. Let two or three hundred two-year old trees be procured (by dealing directly with a nursery, they will not cost over ten cents a piece). Let them be planted in long drills several rods apart but planted thickly in the rows, say seven or eight feet apart. And then let the land between the rows be used for such cultivated crops as potatoes, corn, beans, or garden, planting the crop in drills running the same way as the rows of trees. By this plan the first cost is small, no land is lost, the trees are but little in the way, and if the land be rich the trees will grow rapidly, and if the Wealthy, will soon give the farmer a bountiful and beautiful supply of winter apples. It is also a peculiarity of this variety that when killed to the ground by blight or otherwise it will send up strong suckers which by being thinned to the strongest shoot will soon become a tree in the place of its parent. We are in different conditions from Eastern orchardists and must pursue different methods. Small outlay, early maturing varieties, close planting in wide rows and making the land pay rent with culti-

vated crops, appears to be a feasible method of growing apples for the farmer's home cellar.

But we as farmers and horticulturists have a great work before us in making our State a fit abode for fruits or grains or even for ourselves. If forests increase and regulate the rainfall, if they break the force of the winter's blast and the summer's tornado, and thus somewhat modify and ameliorate the severities of our climate, we should bend our energies to the systematic and thorough planting of forests throughout this great prairie region. Much has been done to educate the masses on planting trees for the beautifying of the home and landscape, but the planting and preserving of forests must be undertaken as a great public enterprise. There are great possibilities in this direction.

REPORT OF COMMITTEE ON MARKETING AND HORTICULTURAL APPLIANCES.

By J. M. Underwood, Lake City.

MARKETING: Anticipating that Mr. Lyons and Mr. Brimhall, who live near Minneapolis and St. Paul, will treat this subject more fully and intelligently as applied to city markets than I could, I will confine myself mostly to home markets for the farmer and small grower in smaller towns.

In the first place my dear friend and fellow sufferer my advice is to create a first class market in your own family. When spring comes put up the frying pan and nail down the cover on the pork barrel, and buy every day from your wife a good mess of asparagus. A little later in the season add to the purchase some lettuce and radishes; and when peas come alternate between young sweet peas (don't wait until they are old and tough) and asparagus.

These things should be planted at four or five intervals of two weeks to insure a succession and long season of choice returns. If you find you have anything to take to town, start your wife off early with the carriage for a nice ride. Under the seat you can store some of the beautiful radishes, a few bunches of crisp lettuce and a half bushel of peas. Never try to market a poor article. But when your wife reaches the grocer with good articles in first class condition she can always exchange them for some nice lemons, oranges, bananas or groceries, or she can take them to the meat market and exchange them for some nice steak for dinner.

Now it is the middle of June and strawberries are ripe. They must have been thoroughly mulched to keep them from getting dirty, as they must be clean and tempting for the market in order to command the highest price. In the first place provide two saucers-full a piece for each of the family at breakfast. Serve them with clear cream and plenty of sugar as it will help you to market more during the day. For dinner the smaller berries can be worked into a short cake, and for supper repeat the fare for breakfast.

To market well, fruit should not be picked when wet with rain, a little rain will not hurt in picking. Put the small and knotty berries in one box and the perfect ones in another. Ask 15cts per quart for the first class and a shilling for the second class, but take less if you are obliged to. Always have clean, sweet, dry boxes. If possible pick when the fruit is cool, and if it is hot, let the berries stand in the shade and wind to cool before crating. Market as soon as picked. It is best to have your market looked up beforehand. Your neighbors haven't raised any. Invite them over and serve them a nice dish smothered with cream, and then sell them a crate at a shilling. If you are far from town you can afford to take 8 or 10 cents rather than go to town with them. Never pick a pail full and take to town where they arrive all shaken down and crushed and uninviting; and then only get enough for them to pay for your time in picking them. It is unsatisfactory to you and to the purchaser also.

What I have said about strawberries will apply equally to raspberries and blackberries—especially the home market feature of it. In support of my position I will state that my family of seven last summer used seventy-five quarts of strawberries, one hundred quarts of raspberries, and one hundred and twenty-five quarts of blackberries. As our fruit averaged us 15 cents in the market it would amount to \$45.00. But this amount was more than saved in meat bills, to say nothing about doctors' bills. You need never let any of these choice fruits go to a poor market, for you can always put them up in glass jars for future use, for the mere cost of the jars. Don't spoil them by the old process of cooking them or adding sugar which discolors the fruit and makes them strong and besides is expensive. Simply fill the jars with fruit and place in a boiler with cold water. Bring it to boiling, and as the fruit settles down, use one jar to fill the rest until they are solid. Don't add any water. Seal while hot. As they cool tighten the cover before setting down cellar. When you serve them add water and sugar to suit the taste. Currants and gooseberries are good only when preserved in this way.

HORTICULTURAL APPLIANCES: I have said so much about marketing that I shall cut this short. Having shown that the best appliance for marketing fruit is your own table, I will pass that point with but one suggestion. Make an estimate early in the season of how many boxes you will need. If you have a good crop get them now and make them up so as to have them ready. After a great deal of experimenting I have gone back two years and am fully convinced that the best implement for killing weeds is the plow, and no one needs to rack his brains to find a better one. I would rather hire the extra help and plow the ground than have it cultivated for nothing. A common eight or ten inch one horse plow is all you want. It turns the weeds all under and leaves the ground loose on the top, so they will not start so soon and thereby saves frequent cultivation, which disturbs the roots and retards growth. Where the ground is mellow, you can with a large horse use a twelve inch plow.

Now that so many are growing raspberries and blackberries I would suggest that you get your blacksmith to make a large crooked knife from a flat file and put it on to a hoe handle. Cut off to four feet long with which to trim out the old canes. It saves the back and does more rapid and better work. For trimming shade trees the best thing in the world is a large chisel. Have it made of good steel by a blacksmith, four to eight inches long and from one fourth to three-eighths inches thick, with a heavy shank and a large collar. Fit this on to a pine stick two inches in diameter and five or six feet long. You can have two or three of different lengths. They should have a heavy ferrule on each end. Put your chisel into one end and hold it at the base of the limb you wish to cut off, and have an assistant strike the other end with a maul. You will be surprised at the ease, rapidity and excellence of the work you can do. The best time is the latter part of June.

Without any opportunity to confer with the other members of this committee I will not venture to cover more ground than I have lest I intrude on their domain.

REPORT ON FRUIT BLOSSOMS. EXTRACTS FROM MY DIARY OF 1889.

By J. S. Harris, La Crescent, Minn.

April 18th. Some bloom open on the wild strawberries, and the leaves are beginning to expand upon the crab apple trees.

April 22d. One Juneberry tree has considerable bloom open, another about 100 feet from it has none open, although apparently in a more sheltered location. Weather warm, windy and mostly cloudy.

April 23d. One variety of native plum is in bloom, also red currants and gooseberry. The Juneberry tree is very full of bloom. Warm and cloudy, p. m. showery, one heavy shower.

April 24th. Cloudy and rather cold, light rain. Vegetation is making no perceptible change. Wind Northwest.

April 25th. White frost.

April 26th. Somewhat warmer towards evening. Cheney plums are beginning to open their bloom.

April 27th. Bloom is expanding freely on the Cheney plum, although the day is mostly cloudy with a cold wind blowing from the North West. An examination shows that the blossoms are well supplied with strong stamens well covered with pollen sacks. Some wild varieties are beginning to show a little bloom open.

April 28th. Some bloom on the Rollingsstone plum. Cloudy, wind Northwest.

April 30th. A few blossoms are open on the DeSota plum. Rollingsstone is coming out fast. Hard frost this morning. Towards

evening pollen seems to have fallen from the Cheney blossoms, and some predict that they will bear no fruit this year.

May 1st. Frost this morning, a few blossoms are open upon the transcendent crabs.

May 2d. Clear frosty morning. Bloom is beginning to show upon the Pride of Minneapolis, and other crabs.

May 3d. Frost this morning, getting warmer through the day. The Duchess bloom are opening. All varieties of plums are to-day in their fullest bloom and for the first time bees and small flies are plenty, and working in the blossoms, so there is a good prospect of their being fertilized.

May 4th. No perceptible frost, warm. Some strawberries beginning to bloom.

May 5th. Warm, very windy. All varieties of apples are coming into bloom. The petals are falling from the plums and crab apples are at their best.

May 6th. Warm, with high wind.

May 7th. Warm with strong wind. Crab apples Duchess, Wealthy, Tetofsky, Haas, and most other varieties of apples are at their best. Choke cherries in bloom and strawberries blooming freely. Hail storm this p. m.

May 8th. Warm with high wind.

May 14th. Some wild grapes in bloom also black cap raspberries.

May 16th. Dewberries commencing to bloom.

May 19th. Blackberries commencing to bloom.

May 21st and 22d. Hard frosts.

May 30th. Frost this morning, a clear cold day.

May 31st. Pick first ripe wild strawberries.

June 5th. A few of Downer's Prolific strawberries are ripe, blackberries in full bloom.

June 11th. A few Concord grapes in bloom.

June 12th. Concord and Worden grapes blooming freely.

June 18th. Delaware grapes coming into bloom.

Aug. 16th. Delaware and Worden grapes beginning to color.

Aug. 22d. Concord grapes beginning to color.

Sept. 5th. Commenced marketing Delaware, Worden and Concord grapes to-day.

REMARKS.

By comparing the above with notes of 1888 it will be observed that trees and fruit plants commenced opening their bloom from 20 to 25 days earlier in '89 than in '88. The advance from commencement to full bloom was a little slower. The marketing of strawberries began some 20 days earlier, and grapes 10 days and they were more thoroughly ripe.

The strawberry crop ranged from a total failure in some instances to a half crop. This is supposed to be the result of late frosts. Currants were not an average crop and the bunches looked ragged and short of berries. Raspberries gave the largest and best crop for many years.

Plums—The one variety that bloomed first matured no fruit. The DeSoto and Rollingsstone yielded an immense crop, and the

Cheney good. Grapes ranged from one-eighth to three-fourths of a full crop, according as they were cut down by frost. In apples most of the Siberians, Duchess and Tetofsky bore full and fine crops, other varieties less. Plums, raspberries and blackberries were not injured by frosts or the earlier blossoms of the apple. The Cheney plum must have been self fertilized before insects put in their appearance.

REPORT ON FLORICULTURE.

By Anna B. Underwood.

In this neighborhood the latter part of the past summer was a severely trying one for flowers of all kinds: Annuals, Perennials, wild and cultivated. When the Golden Rod, and Wild Asters will dry up without showing their bright cheering colors, when the grass turns brown and leaves on the trees change color and fall, the cultivated flowers of the garden so dependent on moisture and good care, cannot be expected to survive, unless the most painstaking care is given them; everything lacking supplied just when needed most.

Occasional light frosts up to the first of June necessitated the replanting of many of the tender varieties of annuals, and also of course deferred the blooming season, then as they began to show flower, the continued dry weather stunted them and soon dried them up past all revival when a shower came at last.

There are some varieties of annuals however that revel in dry hot weather. I will enumerate those that were faithful under all difficulties. *The Eschscholtzia* a very graceful flower—yellow and orange—pretty foliage of itself, fine for cutting for vases. *The Tropaeolum* both dwarf and climbing, literally loaded with brilliant fragrant blossoms. *Salvia splendens* with its scarlet blossoms was also fine. Also *Verbenas*, *Petunias* and *Mignonette*. Asters started out beautifully but they too lacked endurance and soon succumbed; this was a great disappointment as with three long beds of grand plants my anticipations were great.

The display of roses during the month of June, was simply grand—branches literally loaded; but later the Hybrid Perpetuals gave way before the dry weather and very few buds ever reached maturity, generally wilting and withering when about two-thirds grown. By watering the Tea Roses they gave good returns regularly.

While speaking of roses would like to call attention to "The Climbing Jules Margottin," to me one of the most desirable. It blooms only once, but so profusely that it is a great acquisition. It is called a climber, but with me it grows—with some cutting back in the Spring—as a large bush with rather drooping branches which gives grace to the bush.

I have just been wondering while writing this, why the *High*

Bush Cranberry, and the *Hydrangea Paniculata Grandiflora* are not used more in ornamenting gardens. The red fruit of the former and the creamy white blossoms of the latter make a combination rarely excelled. We have so few fall flowering shrubs, that two such reliable ones ought to be recognized in every garden.

I am often asked to name some kind of vine that is suitable for porches, screens, etc. I have in mind one that I have tested for several years past and that has never failed me once—*Clematis Viticella*. I have about half a dozen plants around my plant room to keep out the strong sun of summer, and they do it effectually. Usually after the first summer and always after the second it will send up vines 12 to 14 feet long. It has fine graceful foliage and pretty blue flowers in profusion. In the fall when I want the sunlight again, the vines are pulled down leaving them on the ground. In the spring as the plants acquire age—a good deal of the old wood will be found alive; if not, no matter, as it will send up many sprouts from the root that will make their twelve to fourteen feet growth before flowering.

In spite of the failures of the past season every flower lover is even now filled with great expectations for the coming season, and may it be a more favorable one.

REPORT OF THE COMMITTEE ON EXPLORATION OF FRUITS.

By O. F. Brand, Faribault.

In the spring of 1889 vegetation was very forward. The spring was the driest known for 15 years. May the 4th the wind that had been in the north for several days changed to the south and blew a gale until 5 p. m. of the 8th. The first plum blossoms were seen on the 3d and the first apple blossoms on the 4th. On the 6th apples were in full bloom. I supposed the hot, strong south wind would have destroyed the blossoms. The temperature ranged from 74 to 86 above. As large a crop as was ever known set on the trees of plums, crabs, *Duchess* and seedlings. May 22d, heavy frost, followed by still lower temperature on the 29th, 30th and 31st. Apples and crabs nearly all froze and dropped off. My first visit to other orchards was May 20th, when I called on Mr. J. G. Miller, of Richland, Rice county. His orchard, on the prairie east of the big woods, had set a large crop of fruit. The *Peerless* and all the other seedlings, crabs and *Duchess*, promised a heavy crop, but they were frozen a few days later. I noticed the *Aphis* already very numerous in this orchard.

The next orchard I saw was that of Alex. Douglass, in Blue Earth county. He has a few seedling trees about 8 or 9 years old bearing well. One of these trees bears an apple about like *Wealthy*. Buds were procured and put on to *Transcendent* last August. The seeds from which these trees grew were brought from Massachusetts, but from what variety I could not be sure.

At Madelia I saw a peach tree with fruit on it. The owner also had some 22 varieties of grapes in bearing, and finds them profitable. He named the Brighton as about the best in quality and for keeping. Said he kept them good till late in March. His manner of keeping grapes is to lay the bunches in a shallow basket and hang them up in a dry, cool cellar.

Near Madelia a Mr. Scales has a small orchard in which he has 6 or 8 Duchess and some crab trees. They have been planted from 15 to 18 years. The Duchess always produce more fruit than the family need, and a handsome sum is annually realized from the sale of the surplus. His orchard is on the prairie surrounded with one row of cottonwoods.

Driving west from Madelia, through the St. James and Mountain Lake section, where the Russian mulberry was first introduced, I could not learn that it was regarded as of any particular value there.

Near Windom, in the Big Pond region, a Mr. Miller has some fine young bearing trees of Wealthy and Duchess. He has a small lake to the west of him. I next visited Worthington, the prohibition city of the west. The first thing that particularly attracted my attention was the large number of European nut ash used here for street and ornamental purposes. In some instances lots are surrounded with these beautiful trees, much to the credit of the people who planted and cared for them. Here I paid a visit to Mr. Ludlow on Lake Okbena and took a look through his very fine orchard; Mr. L. not being at home, I returned a few days later, spent the night with him and he and I had a very interesting local horticultural meeting. This orchard was started by our old member Mr. G. J. Hoffman, now of Selma, California.

Here are some of the best Tetofsky trees to be found in the state. Wealthy and Duchess were loaded with fruit. The Okbena although not bearing, showed a fine healthy leaf and was making a good growth. The previous severe cutting of scions from it has undoubtedly injured it somewhat but it shows a marked tendency to recover from injury.

In this orchard are to be found a number of fine top grafted trees which have made perfect unions and bear heavy crops of fruit. This orchard is closely planted and the ground well shaded. In other parts of Nobles county some few good trees are to be found. Mr. Chas. A. Lundberg has some very fine Duchess, Wealthy and crabs. Of a fine tree of Briar's Sweet he remarked "That tree does not owe me anything. It has paid well." He having ordered the Whitney from a prominent Eastern nurseryman, I found he had received Walbridge in its place.

In the orchard of Mr. M. Pint, Grand Prairie, Nobles county, I found the Utters. Large red, very fair trees.

East from Worthington on Fox Lake, Martin county, is well illustrated what water protection will do for the fruit grower. On the north side of the lake Mr. Cyrus Webber has a number of varieties. Rambo set, 22 years, bore some fruit in 1888. The Haas, set eighteen years, bore about two barrels to a tree in

1889. He also has Wolf River, Saxton, Astrachan and Talman Sweet in bearing. Fox Lake is four miles long, one half mile wide and from sixteen to eighteen feet deep. To the north of Mr. Webber's orchard are some small lakes or ponds which never dry up, so he is almost surrounded by water influence. On the south side of the lake is the old orchard planted by Mr. A. M. Packard. Here are about ten old Duchess, some of which bore fifteen bushels each in 1888 and had a good crop on in 1889. They are on level ground, heads two to three feet from the ground. The best tree had eleven limbs and all appeared to come out to a distance of from twelve to fifteen inches and there seemed to be no one limb that could be called the leader. These trees are in a hollow square entirely surrounded by timber and on the west side of the orchard the land descends into a ravine sixty feet deep but this side has a thick growth of young timber. In this orchard the Duchess has proved itself of much more value than any of the Crabs or Hybrids. I saw the remains of nearly one thousand Apple and Crab trees here and no profit has ever and it seems to me never will be derived from anything there but the Duchess and *they* have paid at the rate of one thousand dollars per acre in a single year. In this county Mr. John Clay has young trees of Wealthy bearing well. Another man showed me four Wealthy trees, which produced ten bushels in 1888. They are on level prairie with a wind break on the east, west and south but open on the north. On Pierce Lake are some Haas trees large enough to bear twenty bushels each but they produce none.

A NEW RASPBERRY.

On the grounds of Mr. M. L. Pope, of the town of Fox Lake, Martin county, a seedling black raspberry was found which promises to be of great value. Mrs. Pope was very enthusiastic over it. It is now in cultivation among other varieties, and I believe is later than any black variety I know of. I was there July 10th and it was not quite ripe. Arrangement was made to fruit it at my place.

Mr. Pope was a pioneer on the prairie but his house, garden and orchard—large groves and long lines of tall trees which make his farm one of the very finest in Martin county, all go to prove that his time has been well spent.

At Fairmont Mr. W. H. Budd has a large number of new varieties of grapes on trial.

Mr. F. S. Livermore has had a large orchard enclosed by a large grove. The Duchess has paid him well, but I noticed several fine trees of Utters Red, which was also seen in other parts of the county and in Nobles county.

Mrs. Matson, at Fairmont has a fine lot of Malinda and Beach's Red. At Winnebago Mr. G. D. Richardson accompanied me to see an old seedling orchard four miles west on the south side of Elm Creek. This orchard is on a level prairie and protected by a row of Cottonwoods on the north, west and south. Many of the trees are very large and bearing well but the fruit of the most of them appeared to be small; about like Transcendent, although Mr. R. claimed that some of them produced a sizable apple. The farm

being rented, I could not ascertain the ancestry of the trees nor the quantity or quality of the fruit produced. In Faribault county Hon. C. S. Dunbar has a large old orchard of Duchess which pays him better than anything he has ever had on his farm and he has been and still is a great tree planter. Last spring he set twenty-five Peach trees. Mr. P. R. Taylor planted a large orchard on the Cobb Creek. He has fine Duchess trees twenty years old not more than eight feet above water and twelve feet above the level of the creek. Of a *large* orchard of Crab trees the Briars Sweet is the best. The Orange (twenty-five trees) killed with blight several years ago. There was no natural timber along this creek near him. The general surface of the country is very level. He has two flowing wells. I mention this to prove how the Duchess adapts itself to low ground as well as high. His wind break is on the west of his Duchess. In Freeborn county Duchess trees were shown me from which twenty bushels had been gathered in a year. And here I found plenty of Duchess almost every where. Near Albert Lea Mr. Clarence Wedge planted an orchard of the best of the new Russians. His opinion was that they were no hardier than the Wealthy and not nearly so hardy as Duchess.

In August, 1888, I passed through Brown county. Mr. A. S. Van Patten had a number of old Duchess heavily loaded with fruit, while of Hyslops and Transcendents nothing but a few old stumps remained.

Mr. Isaac Johnson of Lone Tree Lake sold \$60 worth of fruit in 1887 and he did the most of his planting in 1878. Here out of the hundreds of thousands of Russian apple trees sold by nurserymen and planted in this state was the only bearing tree I have ever seen, and I have traveled in more than forty counties where they have been sold. This tree was grafted in 1873 or '74 and planted by Mr. Johnson about 1879 or 1880, and has never borne so much fruit even as his Wealthy, although it occupies the best location in the orchard. I think it either Red Streaked or Red Anis and was a very good looking tree when I saw it bearing about a peck of fruit. Mr. H. M. Ball close by has an old tree of Meader's Winter doing well. Mr. Johnson lives about 25 miles up the Minnesota river from New Ulm. He has a fine lot of Balsam Fir planted in 1878 now 25 feet high.

At Redwood Falls the Duchess and Early Strawberry Crab were seen heavily loaded with fruit. Here the beautiful Mountain Ash was again seen rendering the homes where they were conspicuous by reason of their bright scarlet color in contrast with the dark green of the foliage. Here also were some fine large trees of American White Spruce. Twenty-five miles northwest of Redwood Falls we find Wood Lake in Yellow Medicine County. Here I found a few rather poor Wealthy and Duchess but some very fine trees of Meader's Winter Crab, about 18 years planted.

South of Wood Lake (5 miles), lives Julius Frank. At Redwood Falls, I was told that Mr. Frank sold *lots* of apples. I went there to learn the reason why. Mr. Archie Noble, 3 miles distant, also sold fruit and with one exception these were the only men in that

country who had any trees left although everyone had planted an orchard. They told me the reason. They cultivated well, trimmed the trees high and every fall wound the stems of the trees from the ground to the limbs with a hay-rope. Then they arranged their groves so the snow did not drift inside. They had no wind-breaks when they set their orchards in 1878. The hay-rope saved the trees from sun-scald in February, March and April and also from rabbits. Their best trees are Duchess, Early Strawberry and Transcendent.

Martin Penning at Sleepy Eye has the best and largest lot of Seedling Plums I have ever seen. Last August I called on Mr. Heidemann at New Ulm. He has a fine native plum tree small and crooked, fruit very large. With Mr. Heidemann I visited the vineyard of Peter Mack. Mr. Mack has a very large quantity of Clinton and finds them very profitable. He also has a long list of other varieties and has a very good hedge of Buckthorn. Mr. Henry Miller in Nicollet county has some fine trees of the Arctic, a Hybrid Crab, and a great many of that variety were found in Nicollet and Sibley counties. The fruit is larger than Hyslop and better, but has not been fruited long enough to determine whether the trees will blight after heavy bearing. In McLeod county, Mr. Ezra Holmes has ten fine bearing trees of Briars Sweet, all there is left from one-hundred Crab trees. They were bearing heavily last fall.

William Bergen in Sibley county has some fine native plums; several varieties were procured for trial. His P. O. is Le Sueur. Mr. F. W. Biermann of Moltke, Sibley county, also has a very fine native plum. He has also planted one-hundred Scotch Pine and induced his neighbors to do likewise. Mr. Wolford of Medford, has a seedling Grape of value for its earliness. It is a seedling from Delaware crossed with Hartford; sweet and very early. He also has several seedling Apples and Hybrids several years in bearing, one of them a much finer tree than Whitney and another bearing a little apple as large as Minnesota same season but a very prolific bearer. I have them on trial now two years old.

Mr. C. F. Miller of Forest, Rice county, has the finest lot of large Evergreens I have seen in the state and is good authority on Evergreens. His White Spruce are as fine as any Colorado Blue Spruce. His White Pine and Balsam Fir are simply majestic. Mr. C. P. Nichols of Dakota county, P. O. Northfield, has become a public benefactor by planting largely of Evergreens and getting his neighbors to do likewise. Mr. E. W. Hoff, of Castle Rock, has the best tree of the Duchess I have seen. It is the only tree standing where an orchard was set in 1857, stands on level ground all alone, timber 20 or 30 rods north—6 to 8 rods west—10 rods south and one row of shade trees a few rods east; two-thirds of the top is south of the center of the trunk. It produced 25 bushels in 1884, bore in 1886, 1887, and a very heavy crop in 1888. It now looks sound and healthy. A cut of this tree should be procured and inserted in our report, as illustrating better than any theory the best way to form the top of an apple tree. From there I went to see the pioneer vineyardist of Scott county, Mr. Jacob Hattenbur-

ger, six miles from Shakopee. He began with 600 Clinton in 1862. In 1869 set 600 Delaware. Has now 5000 bearing vines; 4000 of which are Delawares. As Mr. Hattenburger has been eminently successful in making *money* from grapes, I will mention three points of interest. His location of vineyard slopes gently to the east in part and a small part is on a north side hill. His rows are eight feet apart and run a little to the south of east. The rows are 20 rods long starting from the west and running east. The east end is about four rods south of a direct line east and west. Mr. H. claims that by having the rows in this shape that he gets the greatest benefit from the *sun* possible. He gives his vines the most thorough cultivation. He covers his vines first with rye straw and then a very thin covering of earth on the straw. He uncovers when the buds of the wild vines begin to swell. He leaves the straw on the ground and that he says is the only manure he ever uses in the vineyard. His Delawares average 6 lbs to a hill. He has them planted 3 vines in each hill and hills 4 feet apart in the row. They were covered when I saw them but they were cut back to 3 or 3½ feet. He has tried no new sorts for fifteen years but has a valuable seedling of his own in bearing nearly twenty years. It seems to me that his location is a poor one, still he has made a great deal of money from grapes.

Now to close my report I will only say that the result of my extensive observations is this: That our climate is all right and if we fail it is because we do not use the right means. If we fail it is we that are wrong and not the climate or location as a rule. If we only learn that there are some little simple things that we must not forget to do, we will succeed. We could not expect the Sioux Indian to succeed in fruit growing; but the white man should rise above the Indian and say that he *will* produce all that the climate will admit of and that we can all raise fruit very much cheaper than we can buy it, the instances I have mentioned fully prove.

REPORT OF EXPLORATION FRUITS AND FLOWERS

By J. M. Underwood, Lake City.

I think I was, courteously placed third on this committee, and doubtless for the reason that the other members, Messrs. Green and Brand, were expected to do most of the work and I was needed only to fill out the number on the committee.

I have no doubt that they will have exhaustive reports to submit. It might be necessary for them to explore the fields of their neighbors for their fruits; and a keen appetite might direct their footsteps into nature's wilds, in search of the untamed but delicious fruits from her lap, or the dewy sweets of the wild wood flowers. But I could not be expected to go prowling around in the woods or on any one else's farm, after I had been crammed full of the fruits of our

own vines or lulled into quiet repose by the perfumes from the choice flowers, raised by my enthusiastic wife. No, I am not an explorer, and I hope the other gentlemen have done the work.

REPORT ON ORNITHOLOGY.

By J. S. Harris, La Crescent, Minn.

Dates of the arrival of birds that are not winter residents, at LaCrescent, Houston county, Minn., as observed by J. S. Harris & Son, Gardeners:

1889.

Jan. 30th—Shore Larks.

March 5th—1 Robin.

“ 11th—1 pair Blue Birds.

“ 11th—1 pair Pedee.

“ 12th—Several pairs Blue Birds.

“ 13th—Black Capped Chickadee.

“ 14th—Robins in considerable numbers.

“ 14th—Red winged Blackbirds.

“ 14th—1 Bald Eagle.

“ 14th—Small flocks of Mallard Ducks.

“ 15th—Crow Blackbirds in flocks.

“ 15th—Pigeon Hawks.

“ 16th—Red Tailed Hawks.

“ 16th—Sharp Shinned Hawks.

“ 16th—Blue birds are preparing to build nests.

“ 17th—Meadow Larks.

“ 22d—Turtle Doves.

“ 26th—Flicker or Golden Woodpecker.

“ 30th—Kinglets.

“ 30th—Wood Sparrow.

“ 30th—Fox Sparrow.

“ 30th—Field Sparrow.

Up to this date the spring birds are not as plenty as usual upon their first arrival.

April 5th—Robins are now abundant.

“ 5th—Pheebes have commenced to build.

“ 9th—Sap Suckers and Cheenruks are here in considerable numbers.

“ 10th—House Martins seen.

“ 13th—First Cabbage Butterfly seen.

“ 19th—Cliff Swallows are here in abundance.

“ 20th—First Brown Thrushes seen.

May 4th—First Rose Breasted Grosbeak.

“ 5th—Heard Whippowil.

“ 6th—Baltimore Oriole is seen.

“ 6th—Hermit Thrush is seen.

“ 6th—Cat Bird is seen.

May 7th—Orchard Oriole is seen.

" 10th—About all of the summer birds are here except the Tanager Indigo Finch.

" 11th—Indigo Finches are here in considerable numbers.

" 12th—The Scarlet Tanagers have arrived and birds of most species are about as numerous as usual, but are apparently a little later in nesting. Without doubt the great majority of this list of birds are more or less beneficial to the farmer and gardener, while some of them are positively injurious to the forest tree planter and fruit grower. In my estimation the one most injurious of all is the true Sap Sucker (*Sphyrapicus Varius Baird*). There are two of the true Woodpeckers that are frequently confounded with the above, viz: the Hairy Woodpecker (*Picus Villosus Lin.*) and the Downy Woodpecker (*Picus Pubescens L.*), but which are among our most useful birds, the more so because they are winter residents. They are often observed flying from tree to tree making diligent search for the pupae of insects hidden away under the bark, or making excavations into the decaying wood for the larvae of the various timber borers. They should never be destroyed or molested, but rather encouraged to remain about our premises.

The general color of the Sap Sucker or Yellow Billed Woodpecker is black, much variegated with white. Feathers of the back and rump brownish white, spotted with black; crown scarlet, bordered by black on sides of the head and nape; a white streak along the eye, another from the *bristly* part of the bill passing below the eye into the yellowish color of the belly and a stripe along the edges of the wing, coverts also white; a triangular brown patch of scarlet on the chin bordered on each side by black stripes from the lower mandible which meet behind and extend into a large quadrate on the breast. Outer feathers black, edged and spotted with white, the rest of the under parts yellowish white, streaked on the sides with black. Length $8\frac{1}{4}$ inches. Female with the red of the throat replaced with white. At certain seasons of the year this bird does very serious injury to some varieties of fruit, forest and ornamental trees. Upon its arrival in the spring it may be seen cutting round holes through the bark upon the trunks just below the branches, and higher up on the larger branches of the Spruce, Pines, Mountain Ash, Apple, and some others. These holes are from one-fourth to one-half inch apart and extend in a line encircling the tree one line above another, so that the tree or branch is so completely girdled that it either receives a severe check or is killed altogether. Not only does this bird commit its depredations in the orchard but in the forest also. In the spring and fall its principal food is the inner bark of trees, and its tongue is not like that of insect eating Woodpeckers, but short and not at all adapted to searching for insects. Small shot and a sharp look out are the means that should be used to prevent its depredations.

REPORT ON ORNITHOLOGY.

By Burton T. Wilcox, of Hastings.

In submitting a short report on ornithology, I beg leave to call your attention to some observations taken during the summer of 1889. The open winter and early spring brought our migratory friends back from their southern journey several days earlier than the preceding year. My notes show the following dates when the first individuals of a few common species were observed, and will give a comparative record of the arrival of the kinds they embrace:

- March 7th—Red-tailed Hawk.
 “ 9th—Wild Goose.
 “ 14th—American Robin.
 “ 14th—Wild Duck.
 “ 16th—Bluebird.
 “ 18th—Crow Blackbird.
 “ 20th—Song Sparrow.
 “ 21st—Meadow Lark.
 “ 21st—Phoebe.
 “ 23d—Killdeer Plover.
 “ 25th—Indigo Bunting.
 “ 25th—Chirping Chippy.
 “ 25th—Mourning Dove.
 “ 26th—Summer Yellowbird.
 April 3d—Belted King-fisher.
 “ 4th—Golden-winged Woodpecker.
 “ 5th—Purple Martin.
 “ 9th—Cooper’s Hawk.
 “ 11th—Chimney Swift.
 “ 15th—Brown Thrush.
 “ 21st—Rose-breasted Grosbeak.
 “ 21st—Sparrow Hawk.
 “ 23d—Red-headed Woodpecker.
 “ 23d—Barn Swallow.
 “ 27th—Cliff Swallow.
 “ 27th—White-bellied Swallow.
 “ 28th—Marsh Hawk.
 “ 28th—Cuckoo.
 “ 29th—Bank Swallow.
 May 3d—House Wren.
 “ 4th—Lea’s Flycatcher.
 “ 5th—Whip-poor-will.
 “ 6th—Baltimore Oriole.
 “ 7th—Wood Thrush.
 “ 10th—Wood Peewie.
 “ 10th—Night Hawk.
 “ 10th—Red-eyed Vireo.
 “ 17th—Orchard Oriole.
 “ 18th—Great-crested Flycatcher.
 “ 23d—Scarlet Tanager.

There are several different species which remained here during the winter months of 1888-9, or came as occasional visitors. The most common of these are the great-horned owl, bluejay, cedar wax-wing, hairy and downy woodpeckers and white-rumped shrike.

The shore lark is one of the earliest arrivals from the south in this locality. It appears from the 1st to the 10th of March, when it lives along the railroad tracks and in farmer's barn-yards. There it makes its home until the melting away of the snow leaves here and there a bare spot in the fields. This is the time for nesting. They select a dry place against a lump of dirt or tuft of grass where they build their nest. It is of very simple construction, composed mostly of dry grass and roots, and is so nearly like the ground about it that to find it without starting the bird or watching her to her nest, is almost impossible. It very often happens that while nesting they are snowed in, and are obliged to abandon their nests and return to their old homes or other protected places for quarters. While walking across a field on the 3d of April, '89, I found a nest of this species, which contained three young birds, and watching this day after day, I found that scarcely two weeks elapsed before they were hopping about the fields with their mother.

REPORT OF DELEGATE TO WISCONSIN.

By O. F. Brand, Faribault.

The Wisconsin State Horticultural Society held its annual winter meeting at Madison in connection with the State Agricultural society. The Horticultural society had but one day entirely for its own work which was Thursday the 6th. I arrived there to meet the society on Wednesday morning. The election of officers had taken place the day before. Mr. J. M. Smith of Green Bay was re-elected president and B. S. Hoxie of Evansville, secretary. On Wednesday a short session was held at which was discussed the question, can one thousand quarts of blackberries be grown as easily as the same amount of strawberries? The conclusion reached was that strawberries could be grown for three cents a quart, and that for 1,000 quarts the strawberries could be grown the cheaper, and also could be grown on soil where blackberries would fail. Some of the speakers thought that for five years or more the blackberries could be grown the cheaper as a plantation of the latter would last twenty-five years. Heavy clay soil was not recommended for blackberries. Mr. Thayer stated that the cost of one acre of blackberries at the end of the first season after they were covered for winter was one-hundred dollars, this included stakes and wires. The president stated that strawberries cost one-hundred dollars per acre when the first crop was ready to pick. Had averaged two-hundred and fifty bushels per acre for fifteen years; said that *large* crops *must* be grown to make the business profitable. He spoke of the necessity of having Pistillate varieties well fertilized and that some seasons Manchester were not well fertilized at a distance of two feet; hoes three

times in spring before gathering first crop. Mr. Harris had lost his crop when the ground was hoed just before a frost. On Thursday, Mr. A. L. Hatch read an essay on "Making it pay on a Wisconsin fruit farm." Said young trees did not need manure but good deep thorough cultivation. Pruning should be done after a mild winter in March or April. High ground was best for an orchard site. He recommended the Duchess and McMahon White as best but said that for the first ten years, with Duchess at 25 cents and McMahon at 50 cents per bushel the Duchess would beat the other 2 to 1. Had fruited the McMahon's white several years. His orchard is on the summit of a hill 300 or 400 feet high, and said it was not so cold or *windy* there as in a valley. Says the Fameuse pays him well. Had sold \$2,500 worth of apples in the two last years.

Prof. Goff gave his results in using insecticides for scab on apples. Had proved that 1 oz. Carbonate of Copper and 1 qt. of Ammonia diluted with 100 parts of water, used as a spray on the apple trees, after the bloom had fallen, and repeated every fourteen days, had made three-fourths of the fruit first-class, and only two bushels in 100 were worthless; while on trees not sprayed, only 23 per cent. was first-class, and 25 per cent. was worthless. Nearly all the poor fruit on the sprayed trees was second-class. Spraying for codling moth would not exceed ten cents per tree, and for both moth and scab not to exceed fifteen cents; used London Purple to kill codling moth—1 lb. to 200 gallons water; recommended two applications. The first as soon as the petals were fallen and again in fourteen days. If heavy rains followed the first application he would repeat after them. He would not apply it during hot sunshine. Where spraying had been practiced for eight years in New York, the codling moth became less and less.

Mr. D. C. Converse read a paper on small fruits, recommended planting raspberries $4\frac{1}{2}$ feet apart each way, and blackberries $3\frac{1}{2}$ by 8. Mr. Root, of Ohio, transplanted strawberries, earth and all, by the use of tin tubes made as follows: A sheet of tin six inches wide and eight or nine inches long, with the ends brought together and a string tied around it; shove the tube down over the plant to the depth required to get the roots. To get the tubes out after setting them in the ground, he used enough water so that by moving the tube first to one side then to the other the earth slipped out, leaving the plant with the right amount of water to keep it from wilting in a dry time.

Mr. Adams raised strawberries for 3 to $3\frac{1}{2}$ cents per quart; hoed them from seven to nine times the first year. Only big crops paid.

A very interesting and instructive paper on "Tree planting and Arbor Day Celebrations," was read by Hon. J. B. Peaslee, of Cincinnati, Ohio. Referring to Germany as one of the foremost nations in tree planting, he said their motto was that, "Whatever is desirable to have appear in public life must first appear in the public schools." He gave a history of his early efforts in having all the schools in Cincinnati engage in tree planting on Arbor Day, and said the results were very beneficial and gratifying. He spoke

of the terrible disaster that had come upon several countries of the old world as a result of the ruthless destruction of their forests, and also mentioned some instances in our own country when dire disaster had followed rapidly the cutting of the timber. He stated that in Prussia the annual income from the forests amounted to \$7,500,000, all being under control of the government. He stated that in New York the Grand Army planted trees on the graves of their comrades instead of strewing flowers on Decoration Day. I would recommend that the entire paper be procured and printed in our reports. In the discussion of the paper, a Mr. Gordon said that tree murder was the crime of the public against his neighbor, society and the universe; said the cutting of the white oaks had damaged his place more than \$2,000, and he would give \$100 each to have them replaced. President Smith stated that one Wisconsin man had set 700,000 trees.

In the evening an interesting paper on Cemeteries was read, in which attention was called to the almost universal shiftlessness that characterizes our country cemeteries. One valuable suggestion in it was that no mound should be made over a grave, but that the surface should be level. A general and indiscriminate planting of trees was thought objectionable. The paper called out some discussion. One man said that our respect for and veneration of the dead, as shown by monuments, was purely Pagan. Another said the Pagans built monuments to their dead because they were human. I am of the opinion that our respect for the dead springs from the universal belief in the immortality of man. To the horticulturist and landscape gardener was given all the credit for the few beautiful cemeteries to be seen.

APPLES—150 VARIETIES.

For several years their apple list for general planting has been Oldenburg, Talman Sweet, Wealthy, Fameuse, Wolf River, Mc-Mahon's White and Yellow Transparent, with a more extended list for favorable localities. The display of fruit on their tables was the finest and largest I have ever seen. It will not be of interest to our society to mention the long list grown in localities unlike any within our state. Still the methods by which these grand results have been achieved may be instructive. I will mention two instances. Mr. H. Gibson and Mr. Springer, of Fremont, Wau-paca county, exhibited fifty varieties of seedling apples and left forty other varieties at home. Their oldest trees are now 40 years old. Their seeds came from 45 degrees and 5 minutes north latitude in Canada, from grafted varieties north of Lake Champlain. The Wolf River is the largest of their list and is supposed to be from the Alexander, grown either in New York or Michigan. There are some long keeping varieties in their list. Among the grafted sorts in their exhibit were Willow Twig, Golden Russet, Fameuse, Talman Sweet, Walbridge, St. Lawrence, Haas, and others. Their best seedlings are Crocker and Jenney.

That old pioneer, Geo. P. Pepper, exhibited about 75 varieties

He had some very promising seedlings, produced by hand fertilization. This he thinks the true method to improve our apples.

Mr. Herschinger, of Baraboo, exhibited 59 plates of grafted varieties, including Rambo, and a large list of equally tender sorts. My conclusion was that the man and location had very much to do with the results. The apples from the western part of the state were from the tops of high ridges. There are some earnest, life-long students and workers in the Wisconsin society. Mr. J. S. Harris and myself were made honorary members of their Society.

During a discussion on old apple trees, and how to improve the apple, Mr. Geo. J. Kellogg, of Janesville, said he had a large number of the Talman Sweet in bearing for 45 years. Had never lost but one tree. He thought it the best tree we have to start a hardy race by crossing with Duchess or something as hardy.

Mr. J. M. Edwards, of Ft. Atkinson, said he set thirty-six Talman Sweet thirty-five years ago, has thirty-five of them now in good condition, also has old Duchess trees; thinks them the two hardest varieties of the old sorts.

Mr. Clark Hewett, of Waupun, travels extensively from his place north and finds more Talman Sweet alive than of any other of the old varieties, 30 to 45 years old.

Mr. J. S. Harris, of LaCrescent, Minn., said he had grown from 400 to 500 bushels of Talman Sweet in a year and thought it the most profitable apple he ever raised. It was a good bearer, did not blow off or drop from the trees, and would cross well with even a crab. He had made such a cross.

Mr. Pepper had made one cross with Talman Sweet that produced a sour apple looking exactly like Talman Sweet. He crossed it on a *sour bough*.

The general opinion among those who were the most competent to judge seemed to be that Talman Sweet possessed more inherent constitutional hardiness than any of the old sorts, except Duchess. On my way home I paid a visit to an old seedling apple tree in Houston county, Minn. It has been spoken of several times in our reports and the fruit has been given premiums at our fairs. The tree is thirty-five years old and now in perfect condition. The fruit is of good quality, season late fall. This tree has probably produced over 300 bushels of apples since 1870, bearing in a single year over 25 bushels. It has been in bearing twenty-eight years. I engaged two barrels of its fruit for next fall, and if I get them I shall use all the seeds for experimental purposes. See report on this tree on pages 137 and 138 Report of 1887.

BOTANY REPORT.

By Edgar D. Sias, Rochester.

Having made no original investigations worth reporting, let me say something about the law of self preservation, as related to plant life.

The usual cant way of regarding plants is that they are great philanthropists. Every peculiarity of structure and function is looked upon simply as a contribution to the welfare of man. We can not, nor do we wish to deny that they are invaluable to us, but are we to suppose that a plant has beautiful flowers just for men to look at, a delightful perfume just to please our sense of smell, a delicious fruit just to appease our appetite? No, indeed, although plants are most generous they may be looked upon as most selfish, and this latter fact must ever be borne in mind in scientific study.

In a grove where the trees are very thick there is a rivalry to see which will get up the highest and get the sunlight.

Watermelons, apples, peaches and pears grow sweet, not to please our palate, but so that we will cut them open and let their seeds out on the ground.

Are we to think that our beautiful garden plants are pretty just for us to look at? Not at all, they are merely sign-boards hung out which say "Bees can obtain honey by applying within," and they don't give the honey away either, they make bees haul pollen to pay for it. The development of wings (pappus) by the Composite Family, to fly south with in the Glacial period, is a remarkable instance of plant growth looking out for No 1.

Why don't the oak and other large trees captivate the eye with an immense crown of roses? Just because they don't have to, their pollen is carried by the wind and they don't need to go to the trouble to advertise for bees.

Then in the study of any plant or its parts we ask why is it so, for its own reasons, not, why is it so on our account. The first question but not the latter belongs to the province of Botany.

REPORT ON VEGETABLES.

By Joshua Allyn, Red Wing.

Early spring weather was very promising and all vegetables started fairly, but severe frost the last of May checked many kinds and entirely destroyed some, especially vines, causing a second planting. Later in summer the exceeding dry weather caused inferior quality in roots, celery and late cabbage; but it was surprising after all these disadvantages to notice the excellent qualities in many kinds of vegetables such as squash, potatoes, melons, etc. In our locality small fruit was a failure but yet I had a second crop of Strawberries in September. I was astonished at my crop of Tomatoes from plants that were frozen to the ground 25th

of May, but owing to the strong heavy roots they sprouted well and yielded an unusually large crop but a few days later than we generally have our first. All things considered I think we might call it an average crop.

TREE BARK.

By A. W. Sias, Rochester, Minn.

However caustic the criticism on this little article, (if deemed worthy of any discussion) no one can accuse us of raking up an "old chestnut" for a text. After fixing on Tree Bark, as a heading for a few rough thoughts, we ransacked all the horticultural literature at our command, to give us some light on the subject, and with very meagre results. We looked through the index columns of two popular works on Botany, without finding the word *bark* at all! Scientific writers have been as mum on "Tree Bark" as they have on my other pet subject of *Pyrus Coronaria*! Practical horticulturists, have perhaps, been still more unmindful of the magnitude of this theme. We shall contend (without authority) that the Bark stands second to no part of a plant, except the leaf. We also introduce what we believe to be a new term for the botanist, viz: *persistent bark*. Botanists frequently speak of persistent cones, like the Pitch Pine cone, for an instance, but we recall no instance where this term is applied to the bark. Landscape gardeners, as well as other tree planters, would find a list composed of all the trees in the Northwest having *persistent bark*, to be quite valuable. We are not theorizing, but speak from careful observation, when we state that trees with *persistent bark* can be seen on this continent ranging through all grades of thickness from four inches up to thirty-six. Or to be more explicit ranging all the way between the Oaks of Minnesota, up to the mammoth trees of California. One noteworthy peculiarity of these warm clad trees is, that they are subject to "Sun scald," that our good friend Edson Gaylord showed us to be so fatal to many of our "so called" hardy forest trees. As to magnitude, they surpass all other plants, or vegetables on earth. As to longevity they ante-date the Christian Era, and some of them are said to be over 2000 years old. Trees can be more accurately judged by their coats, than man! While a tree may infrequently be found with a fair bark and a *black heart*, and still be good in some cases for a hundred years of *noble service*, a man, with a good coat, and *black heart*, is either a corpse, or an animal ten fold worse! Beecher once said in substance that the coat did not make the man, but was a *wonderful improvement* to him after he *was* made! And so I say of the tree, in this climate of such extremes of heat, and cold, a good, thick, *persistent bark*, is a most "wonderful improvement" after the tree is made. In order to show how Minnesota compares with the rest of the

world as regards heat, I will clip the following from the *St. Louis Republic*.

"EXTREME HEAT IN ALL COUNTRIES.—The following figures show the extreme heat in the various countries of the world: Bengal 150° Fahrenheit; Borgia, Sahara Desert 153°; Persia 125°; Calcutta, India 120°; Central American Republic 129°; Cape of Good Hope, South Africa 105°; Greece 109°; Arabia 111°; New York 102°; Spain, Cuba, China and Jamaica, 110°; France, Denmark, Russia and the Sandwich Islands, 100°; England, Ireland and Portugal, 88°; Australia 80°; Scotland 75°; Sweden and Norway 65°; Iceland 42°; and Nova Zembla 32°; never above the freezing point."

Allowing the above figures to be correct, I think the average extreme heat of the world would be a fraction less than 94°, which would show the extreme heat of Minnesota to be several degrees above the average of the whole world. Dame Nature, who understands economy as well as any other woman, has fitted certain plants to endure a certain amount of heat, and when you remove those plants to where it is many degrees warmer, you do so at the great peril of their lives. I observed this *particularly* in experimenting with trees from Norway, notably the Norway Maple, which kills with me some seasons to the snow line. This tree has a thin bark. You will note that our table gives Sweden and Norway 65°, which shows too great a contrast between their extreme heat and ours. Were it necessary numberless cases could be cited where plants have been brought to Minnesota from a colder climate, and died here for want of sufficient *bark protection*.

The first duty of a physician, when called to attend a patient, suffering from an unknown disease, is to attend to the diagnosis. Acting upon this supposition the intelligent tree planter, will most naturally inquire after that *mysterious something* that has proved most potent, in consigning so large a percentage of trees planted here, to an untimely grave? Is there anything wrong, or out of tune, in that delicate, and beautiful piece of mechanism, known as the woody cell structure of our hardy Exogens? All this work is so perfect that we could almost compare these plants to certain watches, whose only difference consisted in the difference in thickness of the cases. How about the beautiful foliage? Here everything is going on with the precision of clock work. How about the cambium layer? Well, now I think we have not only struck the seat of life—but the *strong hold* of our *complaint*! Here the new and the half-formed cells, are vainly struggling with all their power and pent-up energy to moisten up, and crowd back the old bark (there is no crowding towards the wood, there all is solid) in order to form the new annual growth. But alas, the *extreme heat* of this arid clime, has so completely dried up and hardened the too thin bark of the tree, that the life of the cambium layer is so compressed and dried up that it is an impossibility for it to crowd the bark back far enough to form the new layer of wood and bark, hence the tree dies—or at least such parts of the tree where the dry bark has thus compressed the cambium layer. And all for the

want of a thicker bark, to protect the "seat of life" while the new cell structure is in process of formation. This difficulty of drying and hardening of the bark, is perhaps more commonly met with in transplanting the White Pine, and Sugar Maple when of large size, than of most other plants in our state. Add to the bark by winding with rags, or shade them, till they have made one good annual growth of bark. But, says one, how are we to change the natural bark of our native trees? Good plant food and plenty of water, is just as sure to increase the thickness of tree bark, as good oats are to cover up the visible ribs of a half starved horse. When stock men wish to increase certain good qualities in an animal, to use their own term, they "breed up" to it. Horticulturists must adopt the same wise plan. For the *coming winter Apple*, take the thick barked *Pyrus Coronaria*, and the hardiest and best of the Russians, and "breed up" to suit your taste, and fancy!

T. T. Lyon, Prest. Mich. State Hort. Society says: "There are inherent differences in the constitution of the various woody growths, so far undiscovered by science." This comes from most excellent authority, and meets my hearty approval. If this statement of Mr. Lyon should lead any one to infer that the difference in the woody cell structure was more potent, or a better criterion by which to determine the hardness of an exogenous plant than the quality and the thickness of the bark, then I can see where it might be somewhat misleading. But I do not believe that Mr. Lyon will take that view of the subject. I have known the White Oak to make a growth of one foot in a few days, in May and first of June, and then, before sufficient bark was matured to protect the woody cell structure, a frost came and killed the plant down to the old bark. The woody cell structure above and below the old bark was the same, and new tender cells were forming in both alike, and the difference consisted entirely in the difference in *bark protection*. Had I taken the precaution to wind that new growth with rags, all would have been well. The Hemlock Spruce is a very coarse grained, poor quality of lumber, but owing to its thick durable bark, will stand our climate longer than the fine grained White Birch. The Shagbark Hickory will also stand our extreme heat better than the Bitter Nut. Another *point* worthy of notice is, that everything else being equal, we should always prefer a *rough* bark, like the Corkey Elm, Hackberry, Burr Oak, &c., &c. "Breed up," gentlemen, to any good strain you may fancy. You have a most delightful variety of species right at hand, and can call in more if you wish. Now, in conclusion, and you all have good reason for being out of all patience to think I did not arrive at some *conclusion* long ago, were it not so fearfully hazardous, and rash in its very conception, to run counter to a good old friend, who is both physically and mentally my superior, and then that other reason too, so dear to my heart, that I possess the enviable reputation of being the champion *modest* young member of this live institution; I say were it not for these almost insurmountable obstacles in my rugged pathway, I should declare right *here* and *now* that *Heat is King!* but in that event I should be compelled

to announce in the same breath that "*Cold*" is *Queen*! Hence I prefer to let the whole matter drop right here! Hark! methinks I hear a *sighclone*! approaching from the direction of Steele Co.! Aye! and a lectrified Dartt from the funnel, and all Steele clad at that! has just pierced the biggest *Native Crab Tree* in Olmsted county! My kind friends, please excuse *precipitation*! while I "Steal awhile away."

GROWING VEGETABLES.

By Joshua Allyn, of Red Wing.

A ten minute report is requested of me on the subject of growing vegetables for profit. I am glad it is not on selling them for profit, for there is just where the joke comes in, for most of us.

At no season of the year are the hours so precious and profitable for the gardener as in winter. Look up all you can find in books and papers; you will be surprised to see how much you will find of nonsense that is annually written, and yet, on the other hand, you will find hints and methods which your experience tells you are good, true, and what you want. In fact, any article, although you may have read it before, will now in the light of another year's experience give you ideas you did not find there before. When good authorities disagree your own good sense will tell you just what is best for you. In every neighborhood there is one man who beats all others in some particular thing. Naturally self-conceit leads every one to think, "Now, my way is just as good as that of any one else. The trouble must be a defect in my soil or something of the kind." But it is for you the part of wisdom to learn from each his secrets and practice accordingly. Often a neighbor has some short cut in harvesting a crop, or some special use of a common tool, or some home-made attachment to it, which may prove worth many dollars to you.

One of the best early vegetables for profit is the onion, taking one year with another. Early radish, if extra care and a warm location is given, makes one of the best crops. The earliest peas must be added also, while the first cabbage always brings a good round price and quick sale, but will not grow without good ground and the best of care. Early beets are one of my best crops, and, I think, for the time and trouble expended on them, pay well for bunching. They are always in good demand. Potatoes in every market are sure of ready sale, and if early enough, are one of the best paying crops. Sweet corn can be hurried to meet the first demand, and when this crop is sold clean, it is profitable. Melons if planted in sandy soil, sloping to the south, in good heat, and if protected from their many pests, cannot help rewarding one's labor. Winter squash, especially the Hubbard, has become such a staple article that it cannot fail to pay well. Tomatoes, if once

well rooted, handled with care, and set out just after the last frost in May, will, I am sure, come in a paying crop.

I can only give some leading vegetables of early kinds, such as I plant myself.

If gardening is fully decided upon, an asparagus bed should receive the first attention. It must grow two or three years before it gives returns, but then it will pay. All know that the bed cannot be too rich nor too well worked before setting out the roots. Cover every fall with manure and work it early in the spring.

For early radishes, the most important conditions are, a warm sandy soil, made rich the previous year. Or, if freshly manured, use old fine manure; sow the seed as early as possible. My choice of varieties are: Wood's Fine Frame, Scarlet Turnip, white tipped, and Early Scarlet, olive shape.

For onions, a clayey loam is perhaps best, but any good soil will answer, providing it be rich. The quality of soil and the keeping of the beds clean, is what success depends upon. The first onions in market are grown from sets, either the White or Yellow, which are put in the ground as soon as it can be worked in the spring; the sets are raised by sowing seed very thick, and gathering them as soon as the tops are dry. Spread them out so that they will cure well, and keep them in a cool, dry place all winter. Use the very small ones for early onions, the larger ones should be sold for pickling. The later onion crop comes from seed sown early in the spring. Yellow Globe and Red Weathersfield are best.

Beets, spinach and carrots should be sown at the same time as onions for the early crop. There is no danger of getting them started too soon. The Eclipse Beet is the earliest with me. Early Scarlet Horn is the earliest carrot. Extra Large Round Leaved Spinach is best.

Peas should be planted as soon as the ground can be worked, Hancock or Alaska, I recommend for the first crop. American Wonder, Bliss and Ever Bearing are good kinds to follow with. The four may be planted at the same time, they will then bear in succession just right for marketing.

Lettuce should be started under glass and then transplanted outside. This of course is for marketing, after hot-house and hot-bed lettuce has gone by. Hanson's and Henderson's New York are what I prefer for forcing.

Early Dwarf Golden Wax-Bean. This has a thick meaty pod, making it good for a snap bean. It is a popular market kind and very early.

Cory Sweet Corn is the earliest variety of size suitable for marketing. There are usually two good ears on each stalk, and it throws a larger proportion of its weight into the ears than any other corn I know of. I freely recommend this variety. Plant it as soon as possible on good rich soil, in a warm location. If cut by frost it will start a second time.

Cabbage. Jersey Wakefield in its purity is the best early cabbage. Sow the seed under glass as soon as February 1st. Keep the plants healthy and growing steadily till time to set out. Work them often.

Cauliflower. Henderson's Snowball is best; if it gets cool, moist, rich soil, it will give good strong plants and will bring a good price.

Tomatoes. When these are grown the most money is obtained from those first in market. Canada Victor is one of the earliest in my own experience, and especially commendable for the large amount of fruit ripened at first picking. Acme Tomato comes next in my soil, but many new varieties are chosen by others.

Melons There is probably no climate better for this fruit than that of Minnesota, provided you select a sunny, warm slope protected from cold spring winds. If possible use new land of sandy loam formation, which has just been cleared and grubbed. An old sod turned under and harrowed fine is also good. A fork full of well rotted manure should be put in each hill. Plant the seed about the middle of May. Ferry's Peerless, if true to name, is our best melon for both early and late crops. Of the Musk Melon, Christina, Miller's Cream and Jenny Lind are very early, but the Jenny Lind is a rather small variety.

The Ohio potato is my choice for early potatoes. All kinds are easily forwarded by sprouting in a house or under glass two or three weeks before setting out, and the first in the market brings a good price. They are most always in good demand.

Winter Squash. The Hubbard is so well adapted to this climate, so easily grown, and so nearly a sure crop, that, though the demand for it is steadily increasing, there is little in the way of having a supply equal to the demand. The vine is a rank feeder, and when once well established will greedily avail itself of any fertilizers, and in most parts of the West one can depend upon a liberal supply of the best fertilizer, which is stable manure. The roots of this vine, although nearly as long as the tops, run near the surface, descending only far enough to gain moisture, and seem to derive most good from manure, if it be only harrowed in just beneath the surface. Planting should begin as early in May as there is prospect of sufficient temperature to germinate the seed, for the earliest plants yield the most and best specimens of squash.

I have thus selected a few of the best and earliest vegetables which I have found out by practical tests in my own experience with many varieties.

The Western gardener has the soil, and also the fertilizers in his own control, but he is at the mercy of the seedsmen for success in his crops. Perhaps there is no swindling so extensively practiced, and which so cruelly injures the operator of the soil, as the poor seed sold from stores. I find in my dealings there are none so honorable or reliable in seed as James J. H. Gregory, of Marblehead, Mass. I would not advise any one to buy from the stores.

As a rule I have found most profit in marketing my crop just as soon as ready. Storage is always laborious and risky.

To make market gardening a success, you must use every inch of the ground, must fight each foe and wily pest.

Must work early and must work late,
Nor deem the time and care too great;
And when care and labor's past—
Success will crown you at the last.

DUCHESS IN FARIBAULT COUNTY.

By L. C. Taylor, of Wells, Minn.

In 1871 I planted twelve trees of the Duchess of Oldenburg. They are all good now. My orchard is on the level prairie about twenty miles south of the big woods. It is on the bank of the Cobb Creek which is generally nearly or quite dry in summer. The apple trees are not more than fifteen feet above the bed of the creek. The soil is a rather deep black, sandy loam on clay subsoil. Trees stand about sixteen feet apart with trunks five feet or more in height. The best trees are on the lowest ground and in freshets the water is up to them. The bed of the creek is from four to twenty rods from the trees. I have cultivated the orchard every year until about five years ago, when I made a hog pasture of it. I think hogs are an excellent thing for an old orchard. I always mulch the trees with manure after the ground freezes, spreading it out well over the roots. This keeps the frost in the ground later in the spring. I cultivated well after the frost was out under the manure. The bark on my trees fairly glistens they are so thrifty. They began to bear about fifteen years ago. They bear very heavy crops. I have eight children married and living in this vicinity and the most of them get their apples at "Father's" but notwithstanding that large market, I sold sixty bushels to other people in 1888. I think the twelve trees must have borne about ten bushels each that year. Sometimes the snow will be drifted eight feet deep among my apple trees. My wind break is one row of Cottonwoods, eight feet apart on the west side; a heavy grove on the north side; a thick row of soft maple on the south side and one row, eight feet apart on east side. There is space of about fifteen rods between the Duchess trees and east wind break but they are pretty close to the west wind break. Snow has never broken my Duchess but it used to break the limbs of the Crab apple trees. I once had a large orchard but in the spring of 1873 the most of the apple trees killed except the Duchess. Have set a good many since of New Russians and others but the Duchess are the only good trees I have except Crabs. I am now nearly eighty years old. If I were twenty years younger I would plant twenty acres of Duchess on this cold windy prairie; nothing would pay so well. I am heartily ashamed of thousands of younger men who are either too stupid, lazy or shiftless to grow their own apples. Their course only encourages their children to steal apples from the few who do raise them. Let me say to all such. You do not deserve to be called a respectable farmer unless you raise all the summer apples your family needs. If you do not do it you are no honor to our state. You are trying to prove to the world that our state is not fit for a white man to live in

OLD DUCHESS TREES.

By Asa R. Snow, of Lidia, Scott County, Minn.

I live on a high knoll about three miles south of Spring Lake. My orchard site which was heavy timber thirty years ago, is now fully exposed on the south, west and north. I have twenty or more Duchess that I planted over twenty years ago. They are still good trees. This last summer we sold about seventy-five bushels from them and in the summer of 1888 more than one hundred bushels. The trees have paid well for the last fifteen years or more. They take up but little ground and the money I get for them comes the *easiest* of any I get from the farm. I have one good Wealthy tree. I paid \$1.25 for it in the spring of 1878. It was a seedling Crab tree with two limbs, each limb being grafted with Wealthy, about twelve or eighteen inches above the forks. The grafts are from four to five feet from the ground. This tree has been a very profitable one. I picked as many as four bushels from it in 1888. It has been bearing ten years. I think the Wealthy should be top grafted on some hardy Crab if sold in this state. I have had more than one hundred of them root grafted set the same year as the one spoken of and I know they do not pay. As for the Duchess the man who owns a piece of land and lives on it and will not grow Duchess apples for his family, can not be called one of the best citizens. I feed the ground well, cultivate it well and mulch every winter after the ground freezes. I am careful not to hit the trees to injure the bark while cultivating and do not plow deep.

PRESIDENT'S ADDRESS OF McLEOD CO. HORTICULTURAL SOCIETY.

By M. Cutler Sumter.

Fellow Members, Ladies and Gentlemen:

Another cycle of time has passed and we gather once more for mutual benefit and to compare notes and receive and give instruction in our several vocations.

The past season has been one of discouragement and disappointment to most horticulturalists of the Northwest. Untimely frosts and drought have blasted our hopes. Still we must not look back or become discouraged. The darkest part of the night is often just before day and we have good reason to believe that those who persevere and care for their fruit well, will reap a good reward.

Last winter being mild most small fruit came out in good condition, and gave promise of a good harvest, but the frosts of the

last of May blighted a large part of it. Our strawberries that were uncovered early were badly injured, but those kept covered until about the 10th of May produced an abundant crop, so that we harvested about fifty 24 quart cases, which sold readily for \$3.50 per case. Raspberries were nearly a failure. Blackberries badly injured by frost and drouth, had about 400 boxes. We consider Snyder for early, Ancient Briton and Taylor's Prolific for late, the best kinds to grow. Grapes were badly injured by frost, still we had a few nice ones, the best being Worden. I recommend Worden, Moore's Early and Brighton, and believe it will well pay every farmer and citizen to set a few vines of these kinds. You can get good vines by buying direct of nurserymen for from 10 to 25 cents.

BEE KEEPING.

With a desire of increasing the usefulness of this society we have this year taken a new departure and invited our bee-keeping and sorghum growing friends to meet with us, thus following the plan adopted by the State Horticultural Society. Instead of offering premiums for exhibits at this meeting we decided to use part of our funds in getting instructors of experience to attend the meeting. We hope to make of it an institute in which all will be free to ask questions and speak without reserve. Owing to the favorable season beekeeping has attracted more attention in this part of the state than ever before. Many people have a swarm or two of bees and know a little about caring for them. This has been a favorable season and most bees are in good condition. Cellars (where bees are usually wintered in this climate) are free from dampness and they will no doubt winter well, but we fear that the condition of many of these amateur bee-keepers will soon be that expressed in the following lines from the American Bee Keeper's Journal, by Mrs. F. Graham:

Amateur Bee-Keepers' Lament.

Written by Request of Dr. A. B. Mason.

BY MRS. FRED GRAHAM.

I hardly know what is required of me,
When requested to write poetry on the bee;
Surely, Doctor, you must be jesting,
And from all such pranks ought to be resting.

The bees are workers—that I'll allow;
But they sometimes cause a terrible row.
Years ago, I had the bee-fever pretty bad—
Inherited, probably, from my Ma or Dad.

I hived them, and even swarmed them, too,
Till, one day they got mad, and stung me through and through;
My hands and face swelled and swelled, until I thought I'd drop,
And still that swelling did not stop.

I had visions of splendor, and lived at my ease—
All of it to come from those hives of bees;
But they vanished, one by one, away,
And not one of them remains to-day.
Maumee, Ohio.

We hope those attending this meeting will get enough information to make them successful bee-keepers. We know men who have made bee-keeping very profitable, and last summer when we saw the fields and roadsides white with clover blossoms and the bees fairly swarming around the linden trees, we thought what a bonanza we would have if we only had bees enough to gather all this precious nectar.

SORGHUM GROWING.

I have been informed that over 10,000 gallons of syrup were made within a radius of ten miles of this town the present season, and judging by samples I have seen it was of very fine quality. For years very fine specimens of crude syrup have been exhibited at our county fair, and the names of Whitelock, Kennedy and Moore, and no doubt others with whom I am acquainted are becoming famous for the fine syrups they make and sell. The soil in this section seems to be well adapted to the growing of a fine quality of cane, and I hope the business will continue to increase until car loads of your fine syrup will go from here. Cane growers, we bid you a hearty welcome to our meetings and hope you may have a profitable time.

FLOWER CULTURE.

We have always been an admirer of flowers and are pleased to note a rapid increase in their cultivation, especially of house plants. Let the good work go on until every home shall have its bed of flowers, its twining wreaths of roses, its bushes of lilac and snow-ball. Teach the children to love and care for them and they will grow up to be more noble men and women

FORESTRY.

It seems unnecessary to say anything to our prairie farmers on this subject, as most of them have long since learned the value of a good grove around their buildings, but to the timber farmers I wish to give a note of warning. You have denuded the forest so rapidly that I hear of some farmers who owned timber farms who now have to buy their fire wood, and unless this rapid destruction of our forests ceases we shall all be paying tribute to Iowa and Pennsylvania coal mines. I notice that the product of grain per acre is nearer alike in what was the timbered part of our county and the prairie, and I attribute it largely to our setting out trees and your destroying them. It is much easier to save part of your timber than to replant it. So I say to you think twice before laying the ax to the last ten acres of the grand old forest.

Fellow members, I do not feel qualified to longer fill the position to which you have three times elected me. I feel as though other hands can do more for the success of the society and trust that you will allow me to return to the ranks as a private.

If we make of this a Union organization some changes in our constitution is necessary, and I suggest that a committee be selected to make such change and arrange plans for a Union. In union

there is strength and the three vocations contain material for a good strong county organization. Think what a nice and sweet union it can be, fruit, honey and syrup to eat, and flowers to look at. Let us join hands and help to make of this a land flowing with milk and honey, with strawberries and cream thrown in. Thanking you for your kind attention and forbearance with me, I remain yours to serve.

DESCRIPTION OF SEEDLING PLUM.

Raised by C. W. H. Heideman, New Ulm.

PROPOSED NAME "NEW ULM."

[NOTE.—This plum attracted much attention at the last state fair, where it was awarded a first premium as the best new variety.] Secretary.

This Plum raised from seed of a Wild Plum, is six years old; fruited heavily the fourth, fifth and sixth year. Tree healthy, vigorous, not very large, irregular in shape, no well defined head. Branches in alternate years grow nearly at right angles, fruit on branches or spurs, which seem to be tipped with a thorn, no thorns, leaf large, thick, healthy; petiole thick, short, fruit large, two and one-fourth inches long, one and one-half to one and three-fourths in diameter, uniformly dark red when fully ripe, spotted on cheek, flavour excellent. Season August 25th to September 1st, very prolific. Flower large, pistil one-eighth inch shorter than stamens, which are abundantly supplied with pollen.

The original tree was procured by Fritz Jahnke, on the Little Cottonwood river, five miles from New Ulm, about 33 years ago, by him transplanted to his garden where it is still in bearing, and barring early frosts, has been loaded every season. Not knowing how to propagate he planted pits, and raised several trees, all of which were like the original. The seedling above was from this tree. No claim is made that it is any different or better. All of the trees are perfectly hardy; not a tip or a bud has ever been killed by winter. The specimen fruit sent herewith are the last on the trees, and not colored like the type; the best specimens from which measurements were taken, not in condition to exhibit.

This exhibit is only made in order to bring it to the notice of the State Horticultural Society, that it may be named if found worthy.

ANNUAL ADDRESS OF A. W. SIAS, PRESIDENT OF
THE SOUTHERN MINN SOTA HORTICUL-
TURAL SOCIETY.

Delivered at Rochester, Jan. 7th, 1890.

Members and Friends of the S. M. H. S. Society.

We are permitted to greet each other once again, and although from our limited working membership, it would almost indicate that certain persons who should be interested in our work, were disposed to boycott us, yet, through the kindness and liberty of the press, we are enabled to reach a large number, and should not be discouraged. As our former secretary remarked, "we are here for business." And now let us grapple with that most important and difficult problem for solution, known to our fraternity, viz.: Winter fruit. Some might suppose that it looked rather too presumptuous on our part, to imagine that "Dame Nature" should condescend to yield up one of her greatest horticultural secrets, to a small society like this, when so many other larger and richer organizations were standing with open arms to receive it. The following dialogue will explain matters. Dame Nature.—Your society is the only institution of the kind in the Northwest, that recognizes, and *truly appreciates* the fact, that "God made the country," while "man made the city." You have held all your Summer meetings in the primeval forest, you have honored *yourselves* while attempting to honor me. You have in this praiseworthy act placed yourselves nearer to my great warm heart, than you possibly could have done, had you seen fit, as others did, to have performed your work within high brick walls. And then I noticed while the gallant leaders of other societies were coquetting with sweet, rosy cheeked, doll faced Miss Plum, whose beauty fades so quickly, and stuffing her too with the adulator's remark, that she was the most precious gem of the forest, you as stoutly contended for the Apple, "the king of all fruits." And now, as a suitable recompense for this *steadfastness* in the way of *truth* and *justice*, I am about to yield up to your tender care, one of the most rich and glorious secrets, ever before revealed to any similar institution. There is millions in it. It means not only wealth, but health, and a wonderful increase of members to your society, viz: take the wild winter apple of Minnesota, (*Pyrus Coronaria*) that I have been fitting up to supply the millions of people that are now so rapidly settling up this vast Northwestern territory. Fitting up, on the great plan of the "survival of the fittest" through the ever changing seed protection, commencing far, far back beyond the remotest dates of prehistoric times. To supply this aching void for winter fruit, hybridize the *Pyrus coronaria*, with some rich flavored, hardy, thick bark, and thick leaved, red colored Russian variety. Do *this*, and in a few years, vast commercial orchards, will spring up like magic,

all over the beautiful prairies of the Northwest. Why, let me ask you, good Dame Nature, could we not develop the *Pyrus mahus*, and *P. Baccata*, into a reliable winter variety for Minnesota? Simply because I constructed them with a thinner, smoother bark and leaf, suitable for coast regions, and not for the arid plains of the Northwest. The development of the *P. coronaria*, will establish the center of the great apple belt of this country, on parallel 45°, passing through St. Paul and Minneapolis. The crossing of species so unlike will require very careful hand manipulation, and take time, and is the proper work for our experimental stations. In the mean time plant the best of the old sorts and look out for frauds.

THE ÆSTHETIC SIDE OF HORTICULTURE.

Is it not passing strange that the most attractive feature of our work should thus far have been almost entirely overlooked and neglected? It is a recognized fact, in the management of both agricultural and horticultural associations, that in the absence of "*rare attractions*" failure is inevitable. It should be the duty of the ladies to take this matter in hand, and see that we have plenty of good papers on floriculture, and a good display of flowers at our meetings. Every inducement possible should be given the ladies, to take part in our meetings, and help along in this glorious "art that doth mend nature." At the last annual meeting of our State Horticultural Society, the most attractive feature was the fine display of green house plants in bloom.

MINNESOTA GARDENERS.

Far be it from me to find fault, or to criticise any of the laboring classes without cause, in the hope by so doing of bettering their condition. If we view this subject free from prejudice we shall be able to comprehend the fact, that if all the gardeners of our State could be induced to attend gardeners' meetings, and so keep posted on what other members of the fraternity were producing, if for no other object, to keep up an equipoise in their productions, it would prove greatly to their advantage. Let me explain. Last fall I visited the markets of Minneapolis, St. Paul, Mankato, Owatonna and Rochester, and found the market for fruits of all kinds good and active, and remunerative prices well sustained throughout, while the reverse of all this was true of the vegetable market. Then why not keep up the equilibrium in garden products and prices, by growing more fruit and less vegetables? You certainly can't afford to grow potatoes and tomatoes at 15 cents a bushel; musk melons at 25 cents per bushel, &c., &c. Thus far our gardeners have labored under great disadvantages, for want of concerted action. The worse state of affairs noted, was where no organization among gardeners had been kept up. Olmsted county proved to be the banner county at the Minnesota State Fair, last fall. She took the grand sweepstakes of \$200—on vegetables, and the lion's share in prizes on fruits. This society has reason to take some pride and credit in these grand achievements. Where manure can

be had for the hauling. with soil unsurpassed, why should not such location become the gardeners' paradise?

THE SOUTHERN MINNESOTA AGRICULTURAL SOCIETY.

Our society has always maintained the most friendly relations with this progressive institution, and I hope every member will strive to make this friendship perpetual. I would suggest that you appoint a committee to confer with the secretary of the Agricultural Society, in view of fixing on a definite number of apples, pears and plums, and a stated quantity of small fruits, to constitute a plate. A prize of one dollar was awarded last fall on three rotten plums. Fairness to the Fair Association should compel this society to take means to guard against the recurrence of such an award.

In conclusion, I wish to thank the society for the uniform courtesies extended me, for so long a time. At the close of the present sessions I return the chair to you, with the hope and trust that you place it in better hands for the future.

A LADY'S EXPERIENCE IN FRUIT GROWING.

Mrs A. A. Kennedy, Hutchinson.

When I received a card from our worthy President, asking me to write an essay, giving a lady's experience in fruit growing, I exclaimed, "I have not had experience in fruit growing enough to be able to write intelligently;" but will give you my experience in as few words as possible.

When we purchased our little home, five miles north of Hutchinson, I was anxious to do something to help pay for this home, and through the influence of Shobal Baldwin, then a fruit agent living near Cedar Mills, I was led to commence fruit growing. I bought fifty red raspberry plants; one hundred and fifty strawberry plants; and seven grape vines, and commenced fruit growing on a small scale.

Mr. Baldwin recommended the Cuthbert raspberry, Crescent and Charles Downing strawberries and Concord grape for an amateur. I had been brought up in the East, where it was thought a disgrace for a woman to work out of doors, and my husband had been put to learn a trade when but a boy and had always followed it until we came to Minnesota, and more or less for several years after we came here. So that neither of us knew very much about farming. And when I told him I had made up my mind to commence fruit raising he thought it was, or would be, small business. But we cleared and brushed a small piece of ground, he prepared and I planted it.

I put my grapes on low ground and my strawberries on high. My grape vines were covered with white mould and my straw-

berries dried out, so they made but very little growth the first year.

Now I was somewhat discouraged, but I knew it was not the fault of the plants, but the ignorance of the tiller. I soon came to the conclusion that, to make a success of fruit growing, I must subscribe for some paper and purchase some books that treated on this particular subject.

I sent for "Green's Fruit Grower," his treatise on "How to Propagate and Grow Fruit," "Grape Culture," also for "Farm and Garden and Farm, Stock and Home." I now commenced to read and also to practice. My plants changed places; the grapes were placed on higher ground, the strawberries were heavily mulched and kept moist. As a natural consequence they began to grow and bear luscious fruit.

This year on one-eighth of an acre I raised seven hundred and fifty (750) quarts of strawberries, or at rate of six thousand quarts to the acre. This at ten (10) cents a quart would amount to six hundred (600) dollars per acre. I took just as large berries into the market as was brought from the southern states. Am at work on a small scale yet, because I wanted to learn how to take care of a small amount before planting a larger.

I have now one-half acre of strawberries, and one acre of raspberries. I have propagating beds of the following strawberries: Jessie, Bubach number five, Manchester, Jumbo, Glendale, Crescent, Jersey Queen, Windsor Chief, Park Beauty and Mt. Vernon. Red Raspberries:—Cuthbert, Turner and Taylor's Prolific. Blackberries:—Snyder, Ancient, Briton, Stone's Hardy. Grapes:—Concord, Moore's Early, Brighton, Worden, Salem and Pocklington.

If our president had requested me to write an essay on the possibilities of women as fruit growers, I should have exclaimed as Moses, of old did, when the Lord told him to go and lead the children of Israel out from the house of bondage, "I am too slow of speech!" When I contemplate the possibilities of ladies in this direction I am lost. My mind is too slow and sluggish. Is it strange that I, in my ignorance fail, when the greatest minds and brightest intellects of our land can not comprehend? Nothing short of the Great I Am, Himself, the One that sees the end from the beginning can fathom the grand and glorious results that might be attained by them in this direction.

Some think this kind of work has a tendency to make them appear coarse and unladylike. Would to God this thick veil of ignorance might be torn from the eyes of our sisters! There is nothing so refining, so purifying as the language of the plants. When I go out and work among them and watch their steady growth, they speak to me of that "growth in grace" that ought to be taking place in my heart. When I go out among these plants in the morning and see the leaves turned heavenward to catch the dew as it falls gently and silently upon them, they tell me *my heart* ought to be lifted in silent thanksgiving to the great Giver of all good, for the unnumbered blessings He is continually bestowing upon me. And when the fruit appears and I go forth to gather it, they not only *whisper* but speak in language too plain to be misunderstood, that the time is not far distant when the Master will call for the fruits of righteousness at my hands.

And then as the blighting frost has nipped and blighted these beautiful plants, and the snows of winter have descended and enfolded them like a winding sheet, we look upon them with feelings of sadness akin to that we feel when our friends have been taken from our embrace and locked in the cold and icy hands of death.

And then, again, when the winter has passed away, and the beautiful sun has shed its warming and enlivening rays upon them and broken the bands that had held them in a state of slumber for so many months, and they come forth invigorated with new life and beauty, O, then they tell me the beautiful story of the Resurrection, how the Great Son of Righteousness shall arise and burst the bands of death asunder, and we shall come forth glorified and clad in the habiliments of immortality.

I have learned to love these plants, and when I go among them to trim off the dead leaves and pluck up the plants that have become unfruitful, I can hardly take the hoe to sever them but often stoop and break gently with my fingers. This, too has often reminded me of the sorrow it must cause our Heavenly Father, when He has to deal harshly with His children. A lady came to our house this summer and said she would like to go out and see my plants. As we were passing from one propagating bed to another and I was telling the names of the plants, she said: "How can you remember the names? I thought you had a poor memory." I replied, "So I have, but I remember the names of these as I do the names of my children." May the day be not far distant when many more of our sisters see and realize the enjoyment from this healthful employment.

ARE NATIVE PLUMS A FAILURE.

Paper read at the meeting at Rochester, by O. M. Lord, Minnesota City, Minn.

In their wild or natural state some groves bear fruit abundantly. It is said that on the approach of the settlements, the trees rapidly disappear; and this is advanced as one reason why some attempts in trying to cultivate them have not succeeded.

The most general complaint, in bringing them into cultivation, has been, that they refuse to bear fruit, another complaint is, that the fruit when cultivated is not desirable. The last objection can only apply to a more favored clime where the finer fruits are grown in profusion. In regard to disappearance of the trees. It is true that many native plants disappear as the country is settled and improved. It is readily seen why this occurs with Plum trees, as all kinds of stock will feed upon the branches and young trees; and this alone would have a tendency to destroy them in a few years, to say nothing of other conditions resulting from fires, etc. Another reason why they rapidly disappear is: that the trees are naturally short lived: the great majority of them mature and die of old age

within 25 years, and cultivation does not materially change their habits in this respect. In regard to non-bearing, it must be remembered that in attempting to cultivate them, they are entirely changed from their natural conditions.

When wild they usually grow in groups more or less shaded with the soil deeply mulched, with leaves or other vegetation, and the trees so close together that the branches often interlock.

Some of these groups of trees, are known to have grown vigorously in their wild state and die of old age without producing any fruit. When trees have been taken from the woods for cultivation they are often set too far apart, and are not selected with sufficient care in regard to quality of fruit and habits of bearing; and it will be found that variety and conditions of pollenization have more to do with the habit of bearing than all other things put together. Trees of some kinds refuse to bear, though blossoming profusely, unless planted near some other variety. While the general character of the fruit is similar in many respects, there are some varieties entirely distinct in quality, size and appearance, differing in blossom and habits of growth. Experience has shown, that the best results have been attained when these varieties are freely mixed in setting the trees. Indeed some kinds that are barren when isolated, produce abundantly when thus mixed.

The pollen of nearly all varieties is abundant, but remarkably short-lived; or in other words, the time in which the stigmas are fitted to receive the pollen is limited to a few hours. With these conditions understood, the cultivation of native plums is no more difficult nor likely to result in failure than the cultivation of other fruits. In this age of science and progress it is hardly wise to charge any failure to the inherent disposition of the plums, that would bar all attempts to improve them in quality and prevent their general cultivation. To refute any such idea it is only necessary to refer to the names of some wild plums that have established for themselves a reputation almost national in quality, productiveness and general adaptation to market and home use. The Miner and the Wild Goose among the first brought to notice, and later the De Sota, the Rollingstone, the Cheney, the Weaver, the Robinson, Mariana and numerous others. That some of these varieties might fail in some localities, is not doubted, and that the failure might be chargeable to the variety is true; but because the Mariana, Texas Plum or the Robinson from North Carolina do not succeed in Minnesota, it would be absurd to declare that wild plums are a failure, or to make such a statement in face of the fact that the De Sota and some other kinds bear abundantly from year to year under all conditions of culture and varieties of soil. Every fruit grower has learned that climatic conditions exist whereby we sometimes get no fruit, but in the case of plums, in this vicinity they have not failed for two years in succession but once in thirty-five years—1881 and '82. The opinion is prevalent that they produce only every other year, but we have seen them bear successively for several years. Much more might be said on the non-bearing question of plum trees in comparison with the smaller

fruits, currants, strawberries, raspberries, e'c. The conditions of pollenization must be observed to succeed with strawberries, and with all other fruits cultivation plays an important part as well as climatic and other conditions. With all the evidence before us one would hardly be justified in predicting absolute success in cultivating wild plums. That many persons have been very successful cannot be denied, and it may be safely said that when the same intelligence, care and skill shall be given to wild plums that is now bestowed in the successful culture of other fruits, none will respond more bountifully nor will any other fruit give promise of a richer reward for the labor. If therefore an individual has been unsuccessful in bringing plums into cultivation while others succeed, may it not be well for him, if he wish or care to succeed in the future to inquire of himself: Do I know all there is to be known in regard to this fruit? Have I made a wise selection of varieties that are likely to succeed? Have not my old trees outgrown their usefulness? Will the climatic conditions of my locality justify me in trying again? Is my soil and environment adapted to their growth? Have I exercised the good care and judgment that would insure success with other fruits? The probability is, that no one can truthfully answer these questions and at the same time charge a failure to the inherent natural qualities of the plums, and the prediction may here be ventured, that a few years will convince the most skeptical that they are easily cultivated, susceptible of marked improvement in size and quality and destined to occupy a prominent place among our best fruits.

WHERE SHALL WE GET OUR COMING WINTER APPLE.

Extract from letter of C. G. Patten, of Iowa, to A. W. Sias, President of Southern Minnesota Horticultural Society.

Now a few words about the improvement of our native Crab, *Pyrus Coronaria*. If you are "loony" on this subject you have the steady company of several very good horticulturists, such as the Hon. C. L. Watrous of Des Moines, Mr. Matthews, of Knoxville, and Mr. Fluhn of Davenport, Iowa. The last named gentleman showed me a native Crab $2\frac{1}{2}$ inches in diameter, secured from near Rock Island, Ill. Mr. Matthews, has found other varieties nearly as large, and your humble correspondent has seen one with a distinctly bronzed cheek—nearly red—large, oblong ones, and one in Wisconsin, more speckled than a Swarr apple, and almost transparent. The Soulard has been found in two different places, fully 100 miles apart in Wisconsin, and as you know by a fortunate combination of effort and accident, I succeeded in obtaining a cross with our cultivated apple, that has greatly stimulated thought in this state. The gentlemen that I have named are all believers in this

line of work. One at least is cross-fertilizing with Roman Stem, and other winter sorts, and the others are planting preparatory to it. Our Agricultural College experimenter has done work of this sort, and I have also planted a good many seeds that I have hand fertilized, and otherwise as you are aware. But owing to two unfavorable seasons for germination, and as I believe our ignorance also, we have had very poor success in getting the seeds to germinate—making nearly quite a failure of it, but we have a few plants, and we have a few persevering plucky men, who are after more. They realize that if one cross has been obtained, more can be, and we incline to the opinion that they may be developed by “garden culture,” even when no cross is made. The species of our cultivated apple and our native crab, are so entirely distinct, that there is almost a bar to reproduction, being almost analagous to the horse and the ass, in the animal creation. But as I said, we have obtained a cross, and we know it can be done again.

My hybrid is badly crowded by other and larger seedlings, and the apples were unusually small this year. But friend Sias, while you are giving thought to this line of work, don't neglect to hold fast to what we have already achieved. Some of our seedlings and Russians, are worthy of being planted fully up to the 45th parallel, I am advising my neighbors to plant them. My Duchess No. 3, I consider a great acquisition to our Northern list; and the Russian Charlamoff, Striped Anis, Hibernial, Leibey, Vargul, Bergamot, Anisovka, and others that you and I know of are worthy of the attention of our Northern planters. They are good cooking, and some of them good dessert apples, and if they are not equal to the Grimes Golden, or Jonathan in quality, they beat no apples, or little crab apples away out of sight.

LETTER FROM DEWAIN COOK.

WINDOM, MINN., January 4th, 1890.

Mr. S. D. Hillman, Sec'y Minnesota State Horticultural Society.

DEAR SIR:—Yours, requesting a few horticultural notes from this section, is at hand. Very few apples or crabs are grown here. The great bulk of fruit trees sold to the farmers have been destroyed by snow banks, jack rabbits, blight, stock and cold; the impression prevails that it is cheaper to buy apples than to grow them, even at \$1.00 to \$1.25 per bushel.

Strawberries do well here; I have been unable to name the variety usually grown; they are small, very soft, hardy and productive. The Crescents and Downings grown by the undersigned, attract considerable attention by their large size and fine appearance.

Raspberries are found in many gardens; Turners are the oftenest found; they bear without any winter protection. I have but little

demand for black caps. Souhegan gives the grower the best satisfaction; it does not pay to grow the dark varieties of raspberries when the large, bright red ones like the Marlboro, Brandywine and Cuthbert sell so much better.

The future of plum culture is as yet uncertain. Wolff Spur and Rollingsstone seem to lack hardiness, at least in the young trees. The tent caterpillar destroys the usefulness of about every neglected tree. Black-knot, green lice, big green worm, blight, circulio and plum rat, all conspire to make the life of the plum culturist miserable, but I think an orchard of the DeSota and one of the best local natives, properly managed would prove remunerative.

No one attempts to grow the blackberry except myself, and I have about made up my mind that it doesn't pay; the winters are too cold and the summer atmosphere too dry and hot. The Lucretia and Windom are more easily grown, but the grower of these must expect much imperfect fruit.

Grapes are a success, and farmers are just beginning to find it out. Concord takes the lead; the brown rot took the past season about one-third the grapes that survived the June frost. The same rot (apparently) took about the same proportion of my plums.

From a commercial stand point I find that horticultural pursuits are quite profitable here, when pursued to the extent of supplying our local and near markets with fruits and vegetables in their season. It is the aspiration of the writer to attain this end.

Preferring to cut these notes short to further trying your patience, I am,

Very truly yours,

DEWAIN COOK.

WILD FRUITS OF MANITOBA.

By Thos. Frankland, of Stonewall, Manitoba.

A short residence of ten years and engaged in business that calls for very little traveling about, may not give me an opportunity to speak with authority on this topic; yet coming in contact with many of the natives and older residents and my own observations in a contracted area of this large country, give me some facilities for telling you about the fruit possibilities of Manitoba from a wild fruit standpoint.

Along the wooded banks of rivers, on the shores of the various lakes, and in very many of the timbered bluffs that dot the prairies, plum patches (*Prunus Americana*) are pretty generally found. These in the past years have borne most abundantly, but the destruction of the timber, encroachment of cattle and the annual fires have greatly reduced the yield, so that now instead of our markets being plentifully supplied, very few of our settlers can secure sufficient for home consumption. Some have tried

planting out in gardens, but whether from deficiency in pollen when planted in small quantities, uncongenial companionship of the ubiquitous prairie grass and weeds, lack of sufficient protection, or from all these causes combined, the results have not encouraged the planter. The trees would blossom freely, the fruit set thickly, but in a night the fruit would puff out like bladders and very few plums come to maturity. In Ontario we ascribed this to late spring frosts. The writer of this last spring planted a plum patch of about 800 trees—200 natives, interspersed with selections from Minnesota, Dakota, Wisconsin and Iowa, and protected by a belt of young timber on west and south sides, and is hoping for better results. There are yellow, blue and red plums of good size and excellent quality, and while, perhaps, in a state of cultivation they may not sustain their reputation, by mixing up with others partially broken from the wild type, hybridization will so affect their offspring that we may reasonably hope in a few years to get kinds of this delicious fruit unexcelled by those of more favored climes.

The choke cherry, red cherry, and sand cherry are everywhere to be found, but that enemy of the *Prunus* family, the black knot is thinning their ranks; the choke cherry more especially seeming to be more effected by it than any other—hence the wild cherries had better be kept away from experimental plum patches. The sand cherry may be useful dwarf roots on which to raise *Ostrya* cherry bushes. A very common blue berry called "Laskatoon" abounds. From its leaf, bark and habits of growth it resembles, if it is not identical with, the dwarf juneberry of the nurserymen. I hope next season to fruit the juneberry and will then speak more definitely as to their identity. The high bush cranberry in many localities is found in the woods and is very prolific. Wild raspberries, whose stolons endeavor to take possession of all their surroundings, but whose fruit though No. 1 is not in sufficient quantity to encourage cultivation, may in some of their sports furnish us with kinds that will be second to none. The red and black currant, as well as the gooseberry, have succeeded best in our gardens of any of the wild fruits, but none of them have given fruit of quality and quantity sufficient to deter us from planting improved cultivated kinds. The wild strawberry of the prairie in flavor and quality excels all the overgrown aspirants for public approval, but their day is gone and the cultivated monstrosities must take their place. So far our Dewberries have been left undisturbed in their native haunts except by children—non-productiveness has almost hidden their existence. The wild grape, of fair quality, abounds along the banks of the rivers. This is the land of the hazel. There appear to be two species—one growing to a moderate size with large nuts often growing singly—the other a dwarf, bearing its fruits in clusters. I have seen hazel nuts here equal to the best English filberts. The "Mannyberry," a blue berry enveloping an oblong stone seed vessel of good size and flavor not to be despised seems only to be relished by the children in their pic-nic excursions. So far as I know the apple family is confined to the

hawthorne and perhaps two or three other kinds of thorn—and the everywhere to be found prairie-rose, perhaps giving a foundation at least upon which our pomology might *in generations* be built. While, however, if it were possible, it is not expedient to await so slow a process of evolution, the presence of these members of the family may indicate that other higher types may yet succeed, and from the development of north-west seedlings, or even the careful trial of Russian and other apples of sufficient hardiness, productiveness and quality, we may yet hope to make this, perhaps the outside limit, and produce the apple that shall surprise the world.

In conclusion (for I have made this paper too long) bear with me while I say something about the climate, and I cannot put this in shorter compass than by giving a comparison between an official record for 1888-9, as given by Mr. Geo. P. Bliss, chief observer at Winnipeg, and Silas Goss, Lehigh, Webster county, Iowa:

Bliss—lowest mean in November 20° above. Nov. 19th the lowest was 10° below. Maximum ordinarily from 22° to 46°. December coldest day (21st) max. 18° above, min. 14° below, mean 11.

Goss—Dec. 28—17°. Jan. 13—23°. Jan. 14—26°. Jan. 15—35°. Jan. 21—26°. Feb. 9—29°.

Bliss tells us that Jan. 13 here registered—15°; 14th—20°; 15th 5° above; Jan. 21—27°. The lowest record for the winter is on Jan. 18—40°, and on the 26th—35°. He finishes by saying: "the record practically shows that there were only two months of winter, January and February; and then it was only during the night that the lowest readings of the thermometer were obtained." Judging by the weather to date the present winter will parallel last winter's record with considerable more of a snow-fall, there being now a blanket from six to eight inches thick covering our pets and giving hopes of a glorious resurrection in the coming spring, perhaps not more than two months distant.

NATIVE FRUITS AND SHRUBS OF SOUTH DAKOTA.

By Oliver Gibbs, Jr., of Ramsey, McCook Co., South Dakota.

[Read before the South Dakota State Horticultural Society.]

Authors of books write their preface last; and what I say in the beginning is the conclusion of the whole matter, namely, that I really know but a very little about the subject, and much that I seem to know I do not feel so very sure of. This pleasant December weather has enabled me to take several rambles among the native trees and shrubs growing in my neighborhood, and there is not one of them I can look in the face without reading therein a reproach for my ignorance of it. Everyone appeals to me to tell its life history, that its virtues may become better known, that it may be protected from prairie fires and roving

cattle where it stands, or if to be propagated or transplanted, it may have intelligent care according to its special needs. I take off my hat respectfully to the whole tribe and confess my neglect to study them as carefully as I might during their season of leaf, flower and fruit; and to the dead and faded leaves under my feet I promise amends if I am permitted to see their successors another season.

Another final impression is that our entire list of shrubs constitutes the basis of all true forestry; that if we were to put aside all ideas of their direct aesthetic or economic value to man, still, for their agency as pioneers and nurses of the forest and as protectors of the forest from insects by reason of the fruit they furnish to attract the birds, we should need them all; and we must plant them wherever we seek to establish new forests. A proper elaboration of this idea would require an essay by itself.

The varieties to be considered here are as follows:

Snowberry—*Symphoricarpos racemosus*; plum, *Prunus Americana*; grape, *Vitis cordifolia*; gooseberry, *Ribes grossularia*; sand cherry, *Prunus pumila*; choke cherry, *Prunus virginiana*; buffalo-berry, *Shepherdia argentea*; black raspberry, *Rubus occidentalis*; dwarf Juneberry, *Amelanchier canadensis*, var. *alnifolia*; high bush juneberry, *Amelanchier canadensis*; nightshade, *solanum nigrum* (?); red raspberry, *Rubus strigosus*; blackberry, *Rubus villosus*; dewberry, *R. Canadensis*; black currant, *Ribes Floridum*; bitter-sweet, *Celastrus scandens*; Virginia creeper or American ivy, *Ampelopsis quinquefolia*; moonseed vine, *Menispermum Canadense*, Hawthorne, *Cratægus tomentosa* (?); sumac, *Rhus typhina*; prickly ash, *Xanthoxylum Americanum*; wahoo, *Euonymus atropurpurea*; sweet elder, *Sambucus Canadensis*; dwarf rose, *Rosa lucida*; tree rose, *Rosa Carolina* (?).

I place the snowberry at the head of the list, because in my neighborhood it is the pioneer of the forest. It is the first shrub that takes possession of the ground after the prairie fire is fenced out. It grows up thickly, destroys the grasses, is not browsed by the cattle and prepares the soil for the procession of other shrub and tree growth that follows, beginning with such as the grape, the cherry and the plum, resulting in the elm, the ash, the oak, the linden, etc., which finally clear the land of all brush and leave underneath only a carpet of delicate plants adapted to dense shade. If there is any bird that eats its fruit, it has yet to introduce itself. Possibly it may come in time and prove to be the very one we need to conquer some insect as yet invincible. We must remember that the birds that live with us are mostly immigrants as we are. Nation after nation of them is yet to find South Dakota, send in their committee of observation for a season, and afterwards come in colonies to file on their claims as fast as we can fit up the land for their settlement.

The plum is probably the most valuable native fruit we have. The fragrance and beauty of its blossoms make it a desirable tree for the lawn, and a welcome one wherever it grows. The blossoms are usually a pure white, though occasionally we find a variety

showing a pink bloom. There is as much variation in the form of the trees as there is with the apple, some spreading, some upright, some disagreeably thorny, others have few thorns. The fruit is all colors from yellow all over, yellow on one side and pink on the other, to light red, deep red, carmine and purple. In size the plums range from the Concord grape up to the medium or larger European varieties. Some are perfect freestones, some a medium between a cling and freestone, others as clingy as any peach. In season they ripen from August 15th, to late in the fall, and some sorts never get ripe, remaining immature to be killed by the first hard freeze; although the season of the greater number of varieties closes about September 20th. But it is in the quality of the fruit that we find the greatest variation. The most of them are good enough in quality for cooking, and there are many sorts that are really choice for eating out of hand. There are trees that one can never pass without stopping to eat the fruit in its season. Children who happen to be about my place in August and September seem to divide the honors about equally between the watermelons and the plums, and I have seen them halt by the early grapes of good quality, undecided which to eat first, the grape at hand or the plum a little farther off; finally determining the matter by taking a cluster of the grapes and going to the plums to eat both. One accustomed to our native plums soon learns that the different varieties have their special uses. There is some favorite sort for plum butter, another for drying, another for canning, another for preserves, and so on. Some of them have the clear, delicate flavor of the California apricot—sugary enough, acid enough, juicy enough, and not acrid either in skin or pulp. A few sorts are perfectly sweet. Some excellent ones are very firm-fleshed, and bear much handling without injury. All of them will carry to near markets, some of the very best can be shipped anywhere and presented in good condition.

As yet I do not know of a single variety named and recognized in the trade lists. Our nurserymen are watching them closely, propagating such as they think worthy, and preparing for the demand for South Dakota native plums that is sure to come; but one of the first things that ought to be done, is to supply our Agricultural College experiment station with all the promising varieties, and ask its director and its Professor of horticulture to plant a large orchard of them for a test and eventual naming and classification of varieties; and committees of the State Horticultural Society should be sent out as soon as the legislature gives us our appropriation to search for valuable varieties of our native plums, and see that they are supplied to the experimental station and elsewhere practicable for propagation and trial. I do not think we shall make a list of Dakota plums that will crowd the De Soto, Forest Garden, the Weaver, the Rollingstone, the Spear, the Wolf, etc., natives of other northwestern states, off the list; but I do think we shall extend the list considerably with varieties possessing desirable qualities found in none of the sorts named.

I will not undertake to give directions about laying out, planting,

or the general care of native plum orchards; all that is experimental. It is generally agreed that a close mixture of varieties is necessary for such a distribution of pollen as the most of them need for full bearing. We shall find some of the choicest sorts not sufficiently self fertilizing, and others independent like the De Soto. As to distance to plant the trees apart, I measured a thrifty plum tree the other day, and found it wanted a circle eighteen feet in diameter to spread its limbs, and was still growing. Opinions may differ about cultivation. I do not see how it can be done after the trees are two or three years old without cutting the roots and bringing up a multitude of sprouts. My preference would be not to disturb the roots, but keep the orchard in grass and give a top dressing of manure when necessary.

The black knot will be an enemy to contend with. On my own premises, badly infested when I came into possession four years ago, I have got rid of it mostly by cutting it out in the winter. I did not burn the infested brush, but piled it up in other places. Probably burning would be safer.

The native grape is a sure cropper, does well in all situations, thrives under neglect, and prospers under cultivation, and it is a very Methuselah for long life. Considered merely for its fruit it ought to rank higher than it does in public estimation. It is a fruit easy to pick and to prepare for cooking; makes excellent pies alone or mixed with other fruit, keeps well with sugar or syrup added, is good for canning, and it is one of the most wholesome fruits we have. Its wine, used as a tonic in medical practice, has long outranked all other wines in the opinion of physicians who have compared and tested them. This grape deserves a place in any garden; it asks no protection from summer's heat or winter's cold; give it a good spot of ground and something to climb on, and it will yield a crop on every branch as far as you let it run. As an arbor or summer house vine in the garden, it is the best of all our climbers, and matches well with the leaves of deciduous trees trained in espalier form to support it, as it loves something alive to climb on.

We have come to value the native gooseberry more and more each year. We have it only in its native places, where it seldom fails to yield as heavily as the Houghton in our garden. The fruit will average as large as that of the Houghton in full bearing; is of better quality, and the bushes not so disagreeably thorny. The berries are smooth. There seems to be two varieties, one round the other oblong. I would try it in the garden under the same treatment as that given to the currant, and if it grew and fruited as well there as in the woods, should prefer it to the Houghton.

The sand cherry or dwarf cherry tree is about the size of a currant bush, and has a willowy expression when in leaf. Some strains of it are rather trailing in habit, others upright. The fruit varies in size. I have not seen it smaller than the Janesville grape, and have sometimes found it as large as the Concord. Its usual form as seen in my neighborhood is oblong, rather than oblate like most cherries; yet it is reported in other shapes. Its

colors are yellow and black, with glossy skin, making it look showy and attractive in market. Unless quite ripe it is not a fruit to be eaten out of hand, as it has a trace of the choke cherry flavor, but when cooked this disappears, and a flavor and quality is brought out equal to to the Early Richmond. It is an annual bearer and a heavy cropper. In a trial lot I planted last spring I gave the plants a distance of seven feet apart each way. The sand cherry is a rapid grower, and drouth proof. Small plants from layers and root sprouts, planted last spring, have made a growth of two and one-half feet the past season. Unless this native fruit develops some weakness not yet observed or reported, it is destined to be a profitable sort to grow both for home use and the market. It certainly is popular now with those who have it in their gardens. It is propagated easily by layering, planting the pits, and by root sprouts, and presumably by cuttings.

The choke cherry is a beautiful lawn tree—erect and graceful in form, handsome in foliage, and sweetly fragrant in its flowers, whose long racemes, luxuriantly covering the outer branches, and pendulous from the drooping twigs, rival the plum tree bloom in challenging admiration. The fruit is perhaps still more beautiful hanging in long clusters of glossy dark red berries, changing to full black when dead ripe. Unless at the very last of its ripening stage, when its acid flavor almost entirely disappears, it is not a fruit to be eaten uncooked, but in cooking this quality is gotten rid of, and the fruit is then delicious. Nothing makes a better pie or jam than pitted choke cherries. The only objection to the tree is its reputation as a host and spreader of the black knot, but as intimated in remarks about plums, this disease seems easily eradicated.

The buffalo berry is another lovely lawn tree—silvery in foliage as its botanical name implies, fairly graceful in form, unique in the appearance of its fruit buds in late autumn and winter, and the gaudiest of all our trees in the season of ripening. A hillside covered with a sheperdia thicket is one mass of bright vermilion. For screens and garden hedges I know nothing approaching it, and it is possible that under proper training it may be suitable for a farm hedge against stock. The fruit is small, about half as large as the currant, but can be gathered by the handful, although some caution must be used in picking to avoid the thorns. It has a cranberry flavor, quite pleasant to the taste. The season of ripening is the middle of August, but the fruit remains in good condition on the tree for weeks afterwards. It is also a drouth proof tree. It seems to choose the driest and most exposed hillsides, and there is quite irregular, scrubby in form, perhaps from the frequent ravages of fire, but transplanted to the garden, grows fairly upright and symmetrical, with a drooping habit of the lower branches. As seen in its native growth it appears to be about as large in stem as the plum, though not quite so tall or spreading. Nurserymen will probably make no mistake if they propagate this tree as rapidly as possible for the markets far and near. I have learned this year from Prof. Budd how to germinate its seed. All there is of it is to wash out and pack in sand as soon as gathered and then treat the same as plum pits.

Our black raspberry is the same as found elsewhere in the northwest. I could never distinguish it from the Doolittle. In the sheltered situations where it is found it does not winter kill, but in the garden it needs covering the same as any other raspberry. It can not endure drouth in the garden—and must have thorough cultivation, heavy mulching or irrigation to bear a crop in dry seasons.

The dwarf June berry or service berry is a fruit of the huckleberry or blue berry quality. I am not well enough acquainted with it to say much more. It is highly prized by the Indians. Soldiers and frontiersmen who have seen it in its mountain home say it is a delicious fruit to eat and a good cropper. From my own experience I infer that it is a rather weak shrub for transplanting. I buy a number of plants from the nurserymen every spring, but have not yet succeeded in making one live through the summer. Would be glad to hear where I can get some seeds.

The high bush June berry I have not examined in bloom or fruit, but have seen it growing. It is a slim, upright little tree, found usually on the upper edges of thickets, on the south or shady side of the gulches. It would seem to be a very pretty tree for the lawn. Another year I will watch it throughout its growing season, and be able to report more intelligently on its bloom and fruitage. From what I hear, I judge its fruit chiefly valuable as food for the birds.

There is passably good edible fruit obtained from an annual plant found growing in cultivated fields, springing up after the cultivator is laid by and ripening in September. It is of the size of the currant, very productive, black in color, called by the people the nightshade, but looks on close examination like miniature tomato. I do not know its botanical name. In families where other fruit is scarce, it is quite welcome, and can be gathered in any quantity.

The red raspberry I have not seen or heard of as a native here, but it is likely to be found somewhere. Neither have the native black berry or the dew berry, so far been reported.

The black currant is common to all our wooded gulches, though not so plentiful as the gooseberry. It is a pretty shrub, one of the earliest in leaf and blooms in the spring, I think the very earliest of all the native fruits. I have not seen it bearing abundantly, but it may do better in the garden. In size and flavor it is about the same as the black Naples

The bittersweet is a grand climbing vine for a covered walk or an arbor, where dense shade is desirable, but its habit of coiling itself around any support offered makes it death to other vines or shrubs or small trees; hence it cannot be used in combination with other foliage but must be planted by itself and trellised. It is a lovely vine in autumn when its abundant glumes take on a bright yellow, or fire red color, and beautifully adorn the woodlands, or the trellis where domesticated. They hang tenaciously to the vines till far into winter. After the hard freezing weather sets in, the glumes burst open, casting the seeds to the ground, and disclose in bursting still more and brighter color. Gathered in mid autumn they can be kept for holiday decorations, and will last the

year around. For this reason the bittersweet has come to be called the American Holly.

The Virginia Creeper, is the finest of all vines for house porches, from the greater beauty of its leaves, and its superior capacity for clinging. The bittersweet can only climb where it finds a support to coil around. The creeper has fine tough tendrils like the grape that can either hook on to a small support, a nail, a splinter, a peg, etc., or penetrate a crevice. It can thus creep over the sides and along the eaves and roofs of buildings and run up any rough barked tree. Its leaves are delicate in form, of a deep glossy green in the growing season, and in early autumn of a lovely crimson hue, commencing to don their gay attire before the frost, as if in joyful haste to complete the small cycle of their lives and close it with gay banners flying in token of triumph in survival of their perpetuating seeds, now beyond the reach of injury and ready for distribution.

There are peculiar contrasts between the Virginia creeper, the grape and the bitter sweet in their native wilds. The grape, as I have said, loves live wood to climb on, but will go up on anything it can tie its tendrils to. The creeper prefers a dead or decaying tree or branch—like the English Ivy,

“Creeping where no life is seen,
Oh a rare old plant is the Ivy green.”

The bitter sweet and grape are more abundant in the woods, because they can climb on any sort of growing shrub or tree. In looking for the creeper then, you must search for trees of very rough, creviced bark. The grape and creeper love the warm, sunny spots the best; the bittersweets inclines to the cooler slopes. Plant them together, and the bittersweet will clasp the other two in Anacconda coils of death. Plant the grape and creeper together, and they will mingle fraternally. Plant the two side by side, with a live tree in front of the creeper, and a dead one in front of the grape, and they will cross over—the grape seeking the live support, the creeper the other. For this they seem endowed with a quality equivalent to sight or sense. I tried a few years ago to train a Virginia creeper to run from our house porch to a large oak tree standing a few feet distant; gave it a line and tied its leader in the direction to reach the nearest parallel branch of the oak. It grew a little and shot off sideways towards a more distant branch. I tied it again, and again it grew out and angled off, holding up its leader in the air as if reaching for something it wanted. I then discovered that it was pointing to a limb that was partly dead, and surrendered to its evident preference, when after I had strung the line where it wanted to go, it got there expeditiously. It would have spanned the gap all the same by its own process of bridge-building, though at a slower pace than by direct advance on the line. Here again the observer can see something akin to intelligence in the climbing vines. On the side of the house we now live in, we have trained a grape—a volunteer plant we took a fancy to protect. Having secured a firm hold for some twenty feet along

under the eaves, and attained a strength of root equal to the emergencies of travel in "strands remote," it is now bridging, or seeking to bridge a twenty foot space at an upward angle of about twenty-five degrees and get among the branches of a green ash. It sends out a leader in the direction of the nearest branch of the ash, and when it has gone as far as it can hold up its head, a brace is sent out from beneath, angling upwards and fastening itself midway on the leader, which now proceeds as before, as far as it can make the flight on its new support, when other braces are put up, and so onward it goes with its consummate skill of civil engineering, and if undisturbed it will not only reach the ash, but coming generations may some day find it wandering leisurely along over the forests yet to be, to bid good morning to some future horticultural society even here in Madison, fifteen miles away. The thing is not impossible. If it becomes hungry on its travels it knows how to reach down a feeder to strike new root and draw up food from the ground after which it can resume its journey. It has a longer period of life without renewal from new rootlets than any of us who observe or record its history, as the specimen on exhibition testifies.

Prof. Keffer, has given the name of another of these native climbers—the Moonseed vine; but I am not acquainted with it, and there are others, annuals certainly, perhaps perennials also,—some exceedingly pretty ones, that from careless observation, much regretted, I can neither name nor sufficiently describe.

The hawthorn is an elegant tree for lawn planting. Its bloom is much like that of the pear, which its fruit in some respects, though not in color, resembles; and its mass of red fruit is very showy in the fall of the year. It is a favorite food of the ruffed grouse or partridge, imparting to their flesh a most delicate flavor; but have we the ruffed grouse in South Dakota? Who has heard the long roll of its drummer in our woods? It would seem from the long needle pointed spines of the hawthorn growing so thickly on the branches, that it is well adapted for farm hedges. The tree in my woods is never approached by the cattle. They take no chances of being crowded against it by their mates. It seems to be a slow grower. Is there any Scotchman or botanist present who can tell us whether our hawthorn is the one immortalized by Burns?—Its beauty either in blooming or fruiting time is lovely enough to inspire the raptures of any poet; and Bryant's lines—

"The melancholy days have come
The saddest of the year,"

quoted in presence of the hawthorn, the Shpherdii, the bittersweet, the wahoo, the Virginia creeper, the glowing sumacs and all our gay colored forest leaves at the autumn season, seems inappropriate in South Dakota.

The sumach we have in all our wooded gulches. In its native state, it appears best at a distance, when its long, heavy, abundant spikes of seed glumes, vermilion hued, form a mass of strikingly agreeable coloring in the landscape. A close view dispels the impression. Perhaps in cultivation it would show better. Its seeds

have a commercial value for the supply of tannin, and its stems make the best sap spiles for conducting maple sap from the trees to the buckets of any wood that grows, their resinous quality protecting the sugar wood from evaporation at the boring.

The prickly ash seems well adapted as a hedge for turning stock as its spines, though short are thickly placed on the branches, and are quite sharp and very strong. Cattle browse around it in the woods, but do not run over it. Its bark has a commercial value for medicinal uses, and hence this shrub disappears with advancing civilization unless protected from the bark gatherer.

The wahoo we have, but it does not recover and mature as quickly as most other shrubs after the passing of prairie fires, which have burned over all our gulches within a few years, and it is the favorite browse of cattle and jack rabbits. I have not been able to find it in full flower or seed bearing. On the lawn, or wherever protected, it is said to be one of our gayest trees, deserving its name burning bush, from the high color of its seeds.

The sweet elder we have. Its blossoms have a heavy, sweet fragrance, and the fruit is edible and showy; worthy of a place on the lawn. Wine from the sweet elderberry, is a favorite tonic.

The diamond willow grows in all our gulches, always seeking the lowest ground. It is usually of scrawny growth, and it is difficult to find a stem straight enough for a walking stick; its wood takes a fine polish, and a stick with a dozen or more diamonds to the lineal foot is a very handsome curiosity when properly trimmed for show purposes. The largest specimen I have seen was about six inches in diameter.

The common straight water willow also lines the gulches and water courses, and there is another, more of the tree form, with rough darker bark than the others, growing to the size of the cottonwood, and adapted to similar ground.

The native rose I have reserved to the last because it is a favorite of mine, and a flower appropriate to grace either the greeting or the parting scene. If South Dakota wants a nickname, and some of our newspapers are already suggesting their favorites, let it be Rose State, and our people the *Rose Rustlers*, for the rose is our one universal flower, and the toughest rustlers we have. It is of all rose colors, the bush in every rose form, and the bloom constantly coming from June till October. Among the many sorts is a tree rose that grows seven to eight feet high among small timber, and often hangs out its pretty pink bloom among the tree branches, offering the dainty illusion of rose bloom growing on the plum and cherry, or other small trees among whose branches it leans for support. Farmers have much trouble with the dwarf rose in their cultivated fields, but there is always some bank if not a place on the lawn, where all the native roses can be tolerated and where they may well be welcome.

I have brought here with me specimens of nearly all the trees and shrubs mentioned in this article, cut this winter; some of them may possibly be new to a portion of my hearers, and I hope they may be to some extent more interesting from this poor attempt in their behalf.

In closing, I desire to briefly urge the general planting in gardens of our native fruits for trial under cultivation, and of our native shrubs and trees that seem promising for ornamental or economic purposes; especially to recommend extensive plantings of them at our experimental station. Let the state legislature give this all the support needed to supplement and give wider scope to the small amount available for this purpose from the Congressional appropriation.

RATIONAL AND HYGIENIC COOKERY.

By Mrs. Clara S. Hays, St. Anthony Park, Minn.

There is no one subject which should so concern us all as cookery. We are dependent on the right selection and proper preparation of our food not only for our power of enjoying the good and pleasant things of this world, but also for our ability to so work that we merit success; and also to "do unto others as we would have them do unto us" The dyspeptic can do none of these things. Pure air, bathing and abundant exercise are important, but must be accompanied by good, wholesome food. Now since cooking food for some classes of stock is being practiced unless we bestir ourselves cooking for stock will be better done than is that for our families. I recently heard a gentleman say of cooking oats for stock: "Boiling rapidly for a few minutes does no good but if cooked slowly for a long time it pays." This illustrates the proper cooking of the cereals for the table. Yet on our breakfast tables we have oat-meal served which has been cooked only ten, fifteen, or at most thirty minutes. If cereals cannot be well cooked for breakfast leave them for supper, when there is ample time for slow cooking. If a milk boiler is used, time is all that is necessary since the only attention requisite is to see that the water does not all evaporate from the lower boiler. A substitute for this boiler is easily improvised from two pails, or a pail and a kettle. Beans soaked in cold water for twelve hours, boiled until the skins crack when exposed to the air, and then baked twelve or fifteen hours have a very different flavor from the beans which are placed on the table three or four hours after it was determined to have beans for dinner. The long cooking makes them much more easily digested as well as more palatable.

We must know more of the chemistry and physics of cookery, then the subject will be interesting. When we know such facts as that starch grains burst when heated to the boiling point in water; that starch heated much hotter than boiling water without moisture is changed to an entirely different substance, as in the crust of bread; that over-heating some substances, as white of egg, or the curd of milk in making cottage cheese makes them indigestible; when we once become interested in these things we resent a sug-

gestion from any one that cooking is mere drudgery. Here is abundant opportunity for applying all obtainable knowledge and a wide field for experimenting. Hygienic cookery does not mean a skimpy unsavory diet, but embraces all kinds of foods, giving us a pleasing variety from day to day prepared in an appetizing manner.

Many children are made sick, cross, irritable and very unenjoyable companions at home, or even in railway coaches, simply by injudicious feeding. Sometimes there is lack of regularity in meal time, the child eating or piecing at any or all times. I am convinced that the food has much more to do with making young children sick than the so much blamed "teething." Not only should the proper food elements be provided for these little ones but in such a form that they can digest them. A child of three months often needs additional food. "Drooling," which has been an unmistakable sign of teething, is an unmistakable sign, not of teething, but of "starvation." Light bread, so made as to retain all the nutriment of the flour, and at least one day old, is good for small children when crumbled in milk. A piece of good bread toasted and well moistened with milk, is nice for variety. Custards and creams made of milk and eggs, using care not to make the egg indigestible by over cooking, are also good. Pour the milk boiling hot on the beaten yolks and sugar, return to the stove until you can no longer taste the raw egg; remove from the stove, fold in the beaten whites, add flavoring, and you have something appetizing, pleasing to the eye, easily digested and nutritious. A lady at one of the Farmers' Institutes said: "But is not a cream made of milk and corn starch more easily digested than one in which eggs are used?" It may be more easily digested but it is only starch. Some starch is essential, of course, but it cannot supply all the needs of the system. We would soon die of starvation on a diet of starch. Perfectly ripe strawberries are good for young children. They should be crushed, reduced to a pulp, for a child under two years old. Apples are excellent but should not be simply pared and cored, and are especially objectionable if given whole to these young children. Scraped ripe apple has a good effect, and a child seven or eight months old will eat a medium sized apple every morning with its breakfast with great benefit. You have not time? There is no way in which you can economize so much in time. With a well, sunny-tempered baby you can do anything; with a sick fretful one you can accomplish but little. With good care, good food, and good government a child is very little trouble, but without these it is indeed a burden, slowly undermining the mother's health and depriving the child of health and enjoyment, which are certainly his birthright.

I believe one reason for farmers' children being healthier, rosier and stronger than city children is the large amount of pure sweet milk, fresh eggs and vegetables they consume, thus obtaining a better balanced diet. The family table should be well supplied with vegetables and fruits. It is better to omit meats than vegetables, as the same elements furnished by meats may be supplied in milk, eggs, peas, beans, cereals and perfect bread.

Bread made quickly contains a large proportion of nitrogenous food elements, but if many hours intervene between the time of setting the ferment, and baking the loaves, much of the nutriment of the flour is lost. The bread may be light, white and all right so far as the eye can discern, but it has lost the rich sweet taste and odor, and as a food of support and growth it is greatly inferior to that made with strong yeast, and in a short time. In five hours from the time the bread is mixed it should be removed from the oven. This gives us the most perfect vinous or alcoholic fermentation produced by pure yeast, and the short time does not allow the fermentation to go too far, nor any foreign ferment to spoil the nutriment in the dough. Compressed yeast used in the proportion of a cake ($\frac{1}{2}$ oz.) to one pint of wetting, mixing up at once without setting a ferment will give this perfect bread. Of home made yeast, use $\frac{1}{2}$ pint to one quart of wetting. At bed time take the yeast and an equal quantity of water and flour enough to make a batter. Have this mixture at a temperature of 75° F., and put it in a bowl or crock as warm as the hand; wrap up well, letting the outside covering be woollen. The object of this is simply to form new yeast germs, or to allow the yeast plants to multiply, so as to have more of them to work on the flour in the morning. When ready, mix the bread, add one quart of milk which with the water and yeast makes one quart.

Bread is on our tables in some form every meal, yet there certainly is no article of food more poorly prepared or the principles governing its preparation less understood. In my Institute work last winter I made a special study of the bread served us. The best fermented bread we had was that baked in rolls or biscuits for supper. The loaves of bread were much poorer. Discussing the subject of bread with the cook I invariably found that while the rolls or biscuit were baked between five and six o'clock, the loaves were not baked until after supper, from eight to nine o'clock. The additional three hours ruined the bread.

I have frequently asked ladies if they would as willingly sell bread as butter and always receive the same reply, "No, we can make a uniform article of butter, but there is so much luck in bread-making sometimes it is good and sometimes poor." Yet there is no luck about it; have the conditions right and you have good bread every time. Have wrong conditions and you have poor results whether it be bread or butter. Right temperature (75° F.) in bread-making is just as important as is right temperature in churning.

REPORT OF COMMITTEE ON PICKLES AND PRESERVES.

By Mrs. O. C. Gregg, Minneapolis.

PANTRY STORES.

To the good housewife, pantry stores means much; for with these at hand she is often able to surprise her household and occasional guest with something appetizing from her unfailing resources. Oh, yes, the jellies and preserves and even *wicked* pickles, have made many a household glad and sent them forth to the duties of life with happy hearts and renewed courage. The farmer's wife—especially if her husband is an horticulturist,—or even a common gardener, will be able to crowd in among her otherwise crowded duties, the making of many a delicacy to be stored up “for future use.” Thus fortified when the short days of the winter months commence, she will bring out of her abundance “things new and old;” and her reward we find in the beautiful words of the Holy Writ: “Her children rise up and call her blessed, her husband also, and he praiseth her.” We can imagine the fresh bright face of the young wife, or the wrinkled features of the older one beam with joy because she thus realized the blessed results of labor.

Just to help such good housewives in their — I may almost say *divine* work—(if indeed they have not been ahead of me in their resources) I will render a few receipts.

FRENCH JAM.

The addition of one pound of raisins to each gallon of currant jam, makes the very fine French jam. It is also wise to take one half of the currants, mash on stems and cook and strain as for jelly, and add to the other half of the jam while cooking. This does away with half of the seeds which are so objectionable.

FINE FRUIT JELLY.

Take equal quantities of strawberries, raspberries, currants and red cherries, store the cherries; then mix the fruit and put it into a linen bag and squeeze it thoroughly. To every pint of juice allow a pound and one-eighth of best loaf sugar. Let them boil one-half hour, skimming frequently. Try the jelly and if it thickens readily it is done.

CURRANT SHRUB.

Make the same as jelly, but boil only ten minutes, when cool, bottle and cork as tight as can. Add two-thirds ice water when used.

Raspberry, strawberry and blackberry shrubs are made in the same way.

HINTS ON CANNING.

The gathering of mold on canned fruit is a trial to most housewives. Many housewives say it is a sign the fruit is keeping well, but to one who occasionally finds a well kept can of untainted fruit, that suggestion is not quite satisfactory. We think the secret of the well kept can, (if the fruit is fresh) is to have the fruit heated through and fruit and cans as hot as *possible* at the time of sealing.

PICKLED BEETS.

In the fall wash enough beets for four gallons of pickles—do not scrape or cut them; boil until tender, then remove the skins and pack in stone jars without slicing. Use small beets for filling in, so as to pack them closely. While they are still warm cover them with a pickle made as follows. To one gallon of *best* cider vinegar add two quarts of water, two ounces each of whole cloves and stick cinnamon, one ounce of ginger root, one-fourth ounce of whole peppers or small red peppers if preferred, and four pounds of brown sugar. Boil and skim and pour over the beets while hot. Tie a cloth over the jar and over the cloth tie a thick brown paper. They will keep for months in a place just warm enough to prevent their freezing.

COVERING FOR MIXED PICKLES.

Take a cloth and spread one-half of it with a thick paste made of mustard and vinegar, fold the other half over the half covered with paste, and sew it into a bag and tuck the bag down over the pickles.

CHOW CHOW.

Two quarts large cucumbers, two small ones, two quarts green tomatoes, two quarts string beans, eight large cauliflower, a few green peppers, quartered and seeds removed. Cut all five with a knife and put in a weak brine for twenty-four hours. Cook in the same water until tender. Skim out and pour over the whole while hot, a paste or salad dressing made as follows: Three-fourths pound of mustard, one ounce tumeric, four cups of sugar, two cups flour, five quarts of vinegar. Cook in double boiler, skimming constantly. Put in fruit cans.

PICKLES AND PRESERVES.

By Mrs. A. A. Kennedy, of Hutchinson.

It would be impossible to add to the essay written by Mrs. O. C. Gregg at our last meeting on the subject of pickling and preserving fruits, as it was replete with recipes for preparing these goodies in the best and most approved manner. But thinking perhaps our report might find its way among a class of people with whom cider vinegar, loaf sugar, silver spoons and porcelain kettles are a long way in the future, a little pioneer experience might not be amiss.

In the home of my childhood the question, "what shall we do for pickles and preserves" was never heard, for hills and valleys abounded with fruits, it would seem, for this very purpose. But when we emigrated to Minnesota all was changed. The prairie stretched away before us one vista of unbroken sod. The prospect for pickles and preserves was indeed discouraging. The sod was to be broken and whatever we had in this line must be raised. What could it be? was the question that was ever presenting itself to the mind of the good house-wife. It not only followed her by day but it haunted her dreams by night until every farm resolved itself into an experimental station. So she planted and sowed and in the fall she had an abundant supply of green tomatoes, onions and cucumbers for pickles, while ripe tomatoes, husk tomatoes, ground cherries, rhubarb, citron and watermelon rinds were found to do very well for preserves, and even the night shade's purple berries were pressed into service for this purpose. But other difficulties had arisen. Where were the cider vinegar and loaf sugar, hitherto considered as necessities? and now the thrifty house-wife discovered that in the barrel of sorghum syrup furnished by her industrious husband, were untold resources. She found by experimenting that one pint of this syrup added to one gallon of soft water made a vinegar fully equalling if not surpassing the cider vinegar.

Perhaps it would be amusing to some of you to know just how we made sauce by using sorghum. Husk tomatoes are small and the color of blue plums. After husking and washing them nicely we poured them into the sorghum pan, added two gallons of syrup to one bushel of fruit and proceeded to stir with mammoth pudding sticks until they were done. We made thirty gallons of sauce in this way in a very short time. By adding lemon it made very nice sauce. In the same way we made pumpkin butter. For the benefit of those who have not sorghum pan, I will say, that it could be made on a smaller scale just as well.

IMPORTANCE OF DOMESTIC ECONOMY.

By Mrs. Jennie Stager.

In response to a letter to Mrs. Stager requesting a paper on some pertinent subject, her daughter sent the following communication to the Secretary:

MY DEAR LILLIAN:—You say you will be glad to see me at home again. Not more so than I shall be to get there. I am very glad to hear you are learning to make bread. I think it is a mistaken idea to keep girls at school, pushing them forward until both mental and bodily powers are weakened, yet failing to have them taught the most needful lesson in life to a woman, that of becoming a good housekeeper. Indeed, one does not wonder at the in-

crease of divorces when we think of the thousands of marriages, not alone in the wealthy, but among other classes, where the woman has never done an hour's work in the kitchen. We have an old saying that a man's heart is reached through his stomach. Can one wonder then if there is unhappiness in the home where dyspepsia and indigestion reign? Again many thousands of girls in large cities, have no opportunity to gain the knowledge that helps to make home happy, as instead of being bread-makers they are obliged even from childhood to be bread-winners. However a woman can do anything she puts her mind to, therefore a great many of them make excellent housekeepers. Of house-keepers' duties one of the most essential is to make good, light, wholesome bread. With good bread the plainest meals are acceptable. It seems a simple process to make bread. But it requires the utmost care and watchfulness. I need not send you my receipt as full directions are given in all good cook books and you have several at home. I think this will be a different world when girls are taught house-keeping in all its branches, and even if they are not obliged to work themselves, they will be able to order their own houses and not be at the mercy of incompetent servants.

BREAD AND CAKE.

By Mrs G. W. Shuman.

In the present day of the American people it is getting to be a rare occurrence to find young ladies whose intellectual attainments are of high order, who know the duties that pertain to house-keeping and caring for a home. If young women would resolve (let the effort cost what it would) to perfect themselves in a domestic education, there would be far more marriages and less bachelor's apartments.

Every woman is invested with a great degree of power over the happiness and virtue of others and domestic influence of women is certainly of great value to home and society. She cannot help using it and there is no avenue or channel of society through which it may not send a salutary influence.

How frequently is it the case of students in the various walks of life overshadowed by a total loss of health. Did it ever occur to you that this evil could be traced to unwholesome food? Intelligent physicians and superintendents of insane hospitals testify that in many instances this is a prominent cause of insanity. Now is it not worth our time and strength to teach our daughters that they may not grow up dyspeptics nor marry dyspeptic husbands and raise a generation of unfortunate beings with utterly disordered stomachs.

There is a trite saying that "bread is the staff of life" and there is no other one thing upon which the health and comfort of a fam-

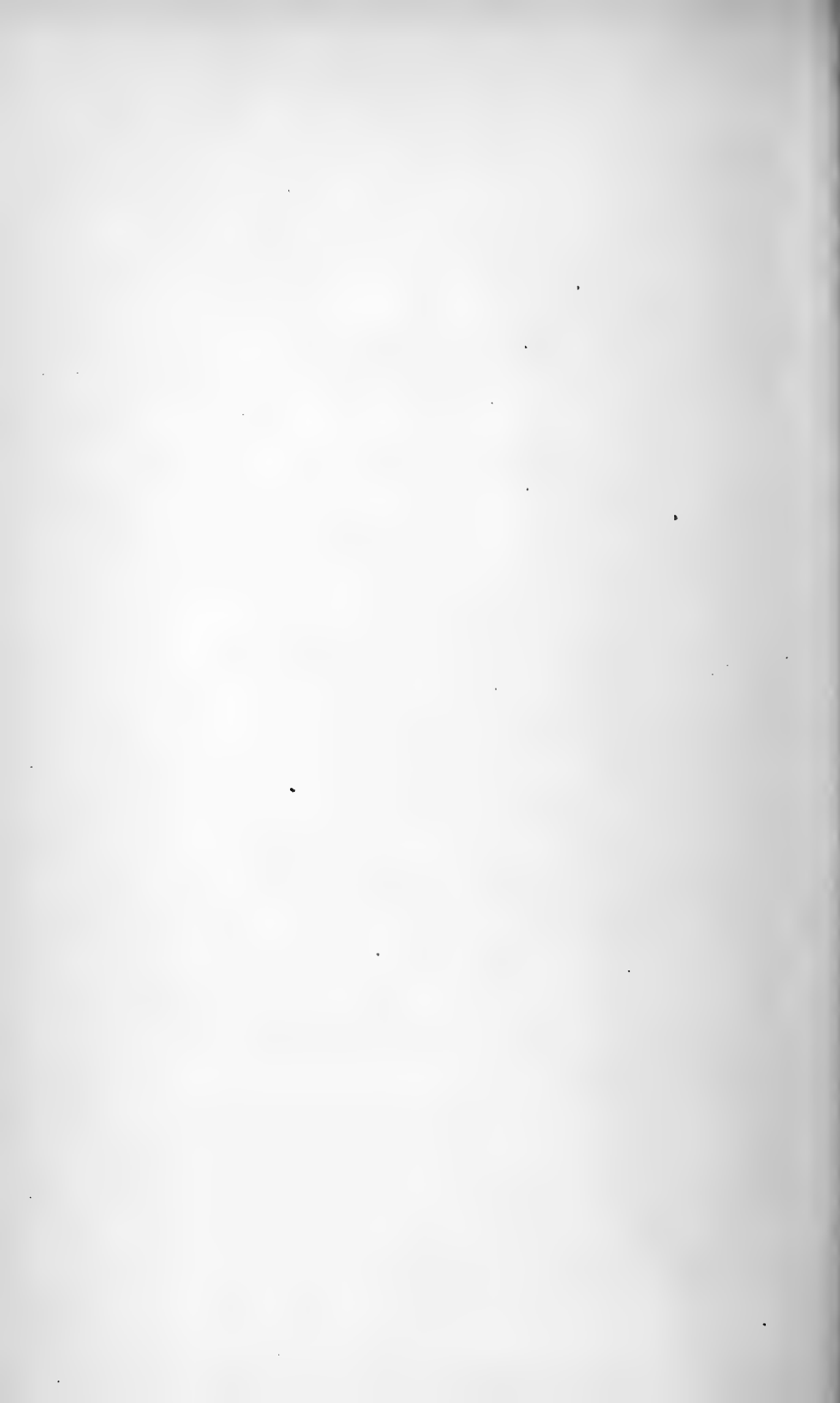
ily so much depends. With good bread the coarsest fare is enjoyable. Without it the most luxurious table is not even comfortable.

In the past two years there has been so much poor flour put upon the market for "No. 1" that it has been almost impossible to make bread that was eatable—let alone being nutritious.

In serving on committees of bread and cake at our State Fair for the past two years I was surprised to see how much poor bread was brought to compete for the generous premiums. Much of it showed a lack of kneading and some was mixed too hard, showing that the housekeeper did not think it necessary to be as particular in mixing, kneading and baking the bread as she did to bake cake. Let me tell you housekeepers that you cannot be too particular in making bread.

In the first place good yeast is essential. The following recipe has been in use in my family for years, and if you make it yourself you will always have good bread. Use as many hops as you can hold in your fingers cooked in three pints of water strained on three large potatoes grated raw, cook twenty minutes and add one tablespoon salt, one of sugar and one teaspoon ginger when it is done. When luke-warm add one teacup yeast to raise it. For setting the sponge take six potatoes boiled and mashed while hot, one-half cup yeast, two tablespoons white sugar, two tablespoons lard, one teaspoon salt, one quart of warm water, three cups of flour, mix all thoroughly and beat it ten minutes, set to raise over night in a warm place. In the morning when the sponge is light sift the flour in and knead it quite stiff, as the grade of flour we have now requires it, spending at least twenty minutes; after raising knead down the second time and make into loaves. When ready for the oven be careful to have the oven well heated and kept up to an even temperature.

Now in regard to cake making. I want to impress upon the farmers wives that *they cannot* make nice, sweet cake, with strong, rank butter, as it will surely taste. The best of butter, eggs and in fact *all* the ingredients that are used for cake must be good and not old. Many times you see cake that seems so dry and hard, again you will find it full of holes showing too much baking powder, or soda and cream tartar. If farmers would take pains to have their wives have a home paper that treats on all branches of work done in the home, like the *HOUSEKEEPER*, a paper which has been a dear friend to many a young house-keeper for the past twenty years, they would find many a savory dish greet them when they come home tired out with a hard day's work.



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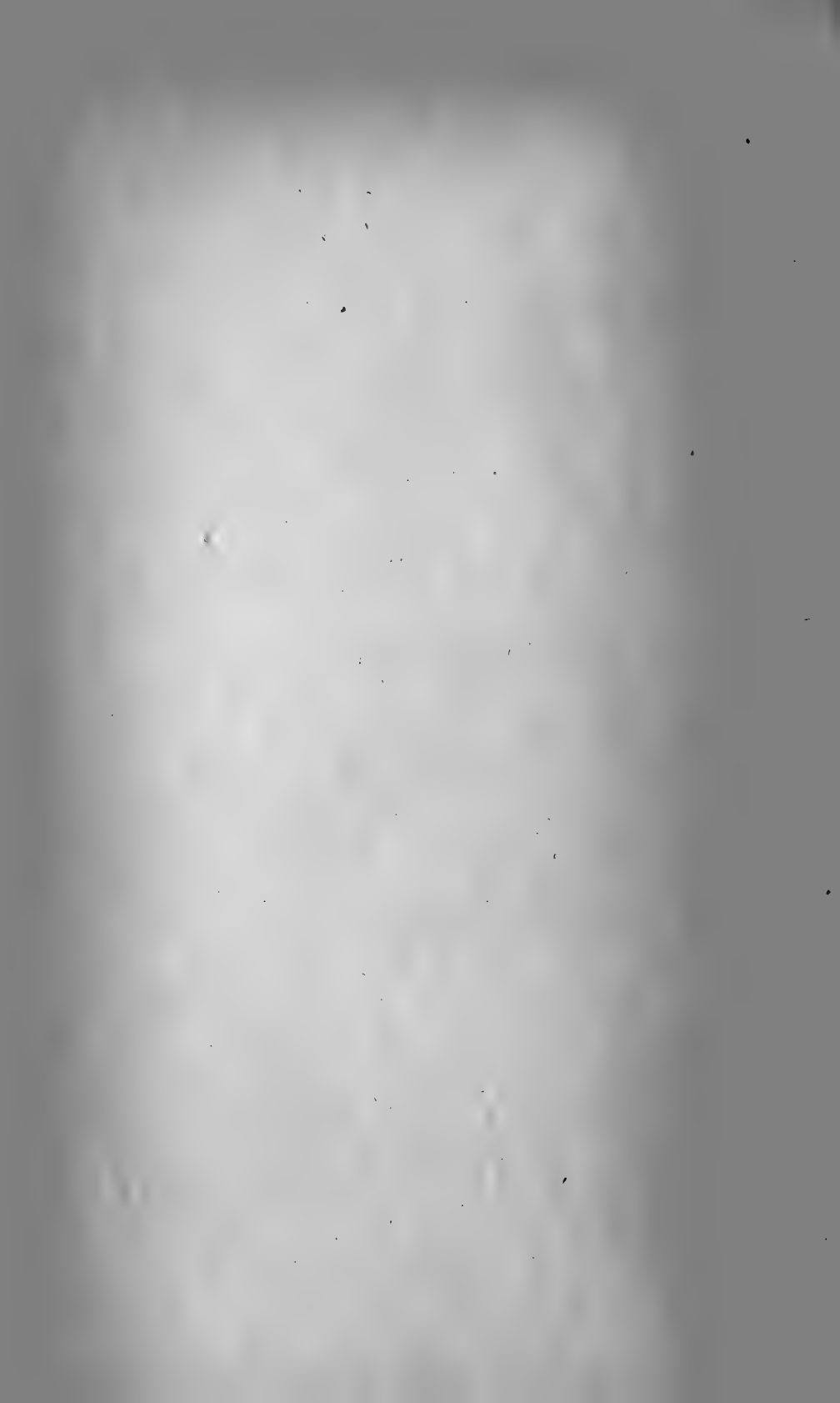
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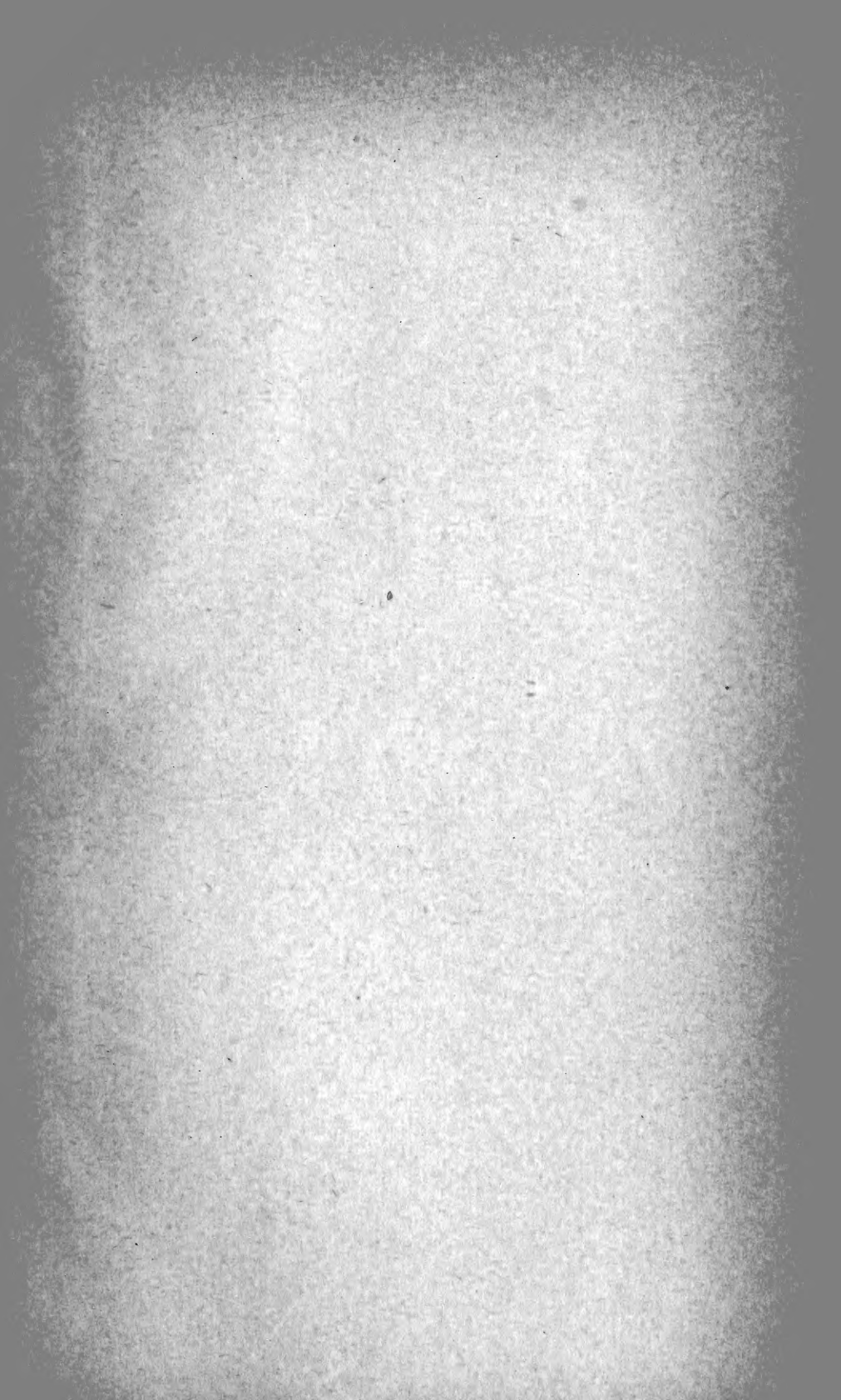
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